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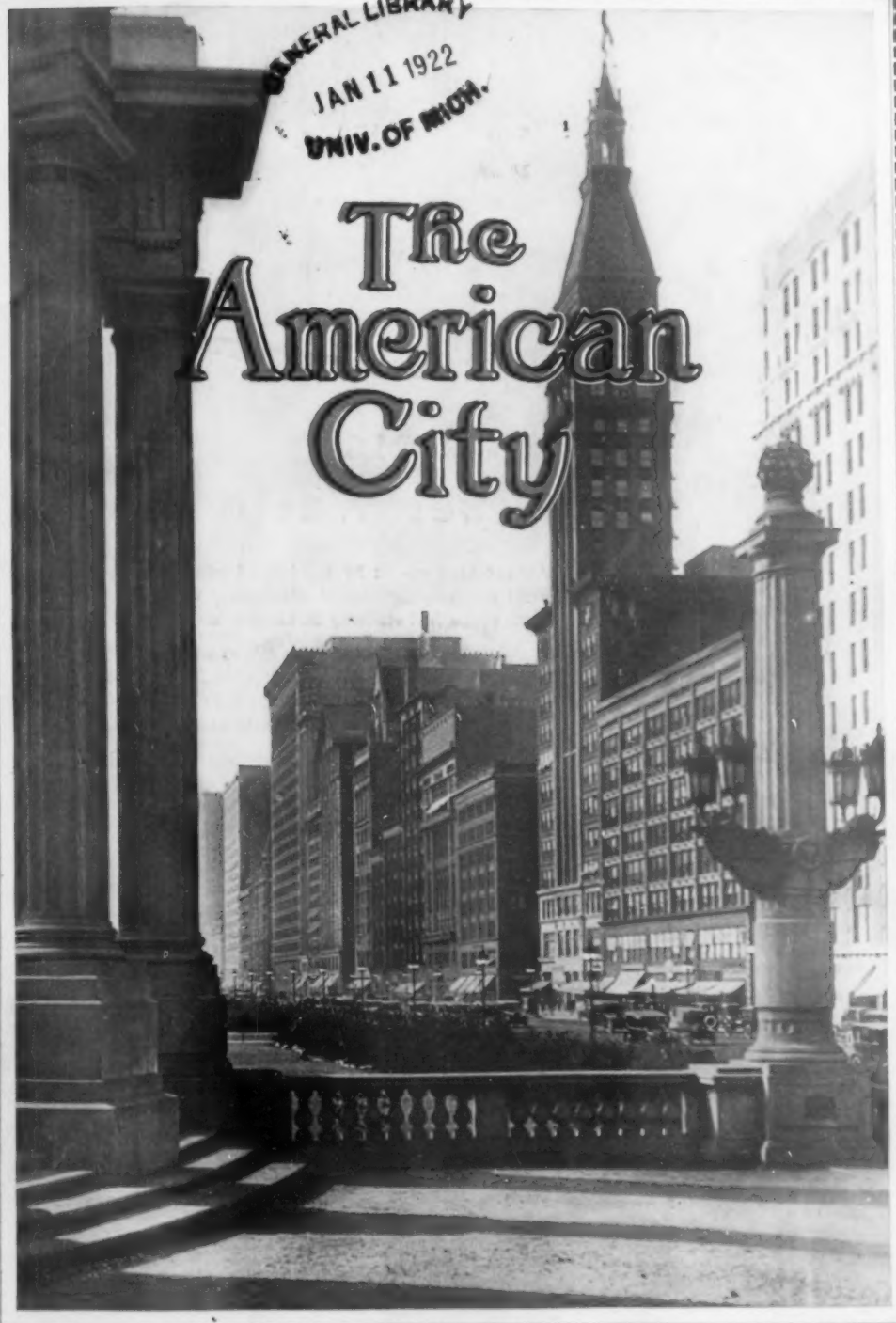

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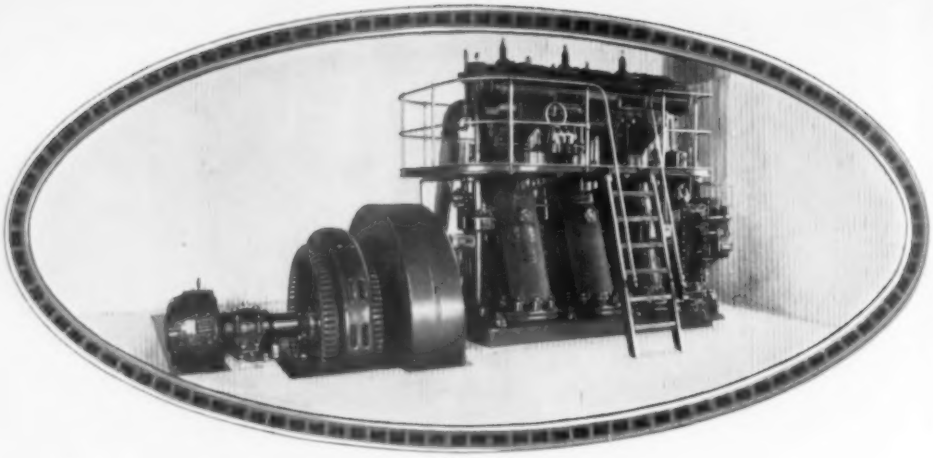

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Reinforcing Gravel Roads for Motor Traffic

The Bituminous Gravel Roads of Hanover, Mass., Have Proved Economical Under Severe Service

By Harrison L. House
Civil Engineer, Hanover, Mass.

VERY soon after the coming of motor vehicles, it became apparent that Hanover must make a change in the construction and maintenance of its public highways. Up to that time we had a very good system of gravel roads and kept them for the most part in good condition. With the increased use and changed conditions brought about by automobiles, the roads went from bad to worse, until they were in a very serious condition.

In 1915, about 650 feet of road, an exceptionally bad piece over clay bottom with water standing in the gutters at all seasons of the year, was rebuilt. This section of road was broken up with a steam roller, and the old road was excavated to a depth of about 6 inches and carted away. A drain 1½ feet wide and about 3 feet deep was dug on either side. This drained into a brook which crossed the road. These ditches were filled with stones 4 to 6 inches in diameter, and the whole width of the roadway was subgraded to a true and even grade and covered 8 inches in depth with field stone of not over 6 inches in diameter. It

THE WELL-PRESERVED GRAVEL ROAD AT THE SQUARE, WEST HANOVER, MASS.

TREATED GRAVEL ROADS NEAR THE LIBRARY, WEST HANOVER, MASS.

was then covered with a good gravel about 5 inches in thickness, the stone foundation and gravel being thoroughly rolled with the steam roller. A road oil was applied to the surface at the rate of ¾-gallon per square yard, and sanded thoroughly, and the next season Tarvia B was applied, and now the road stands up under heavy travel without showing any weakness.

In 1916 a contract was let for the construction of 8½ miles of gravel road, using the same binder at the rate of ¾-gallon to the square yard. The town, with its own men, built about 4¼ miles of the same kind of road in 1916, and each year since has built more or less, until there are now 16.1 miles of this kind of road. In building these roads we first pick up the road with the steam roller and then form the subgrade with a road machine and roll it with the steam roller, removing the large stones and any poor material. Where the soil is spongy or clayey, we have put in a stone foundation from 6 to 8 inches in thickness. Of the 16.1 miles, about one-fifth has been built with the stone foundation. The gravel used is put through the stone crusher. On the whole, this has been found satisfactory, but to keep the material well mixed, care must be taken. In the later work the larger stones were taken from the gravel, crushed and applied separately.

The roads are made 24 feet in width between gutters, and Tarvia B applied 18 feet in width in the center, except around the curves, where it is increased to about 21 feet. The binder is applied in three coats of ¼-gallon to the square yard, and the last coat is well sanded with coarse, sharp sand. The stone foundation is made only 15 feet in width in the center of the roadway, with blind drains 20 to 30 feet apart opening alternately on either side of the road to drain the foundation. It has been found that where the grade is nearly level, these blind drains are a great help in keeping the road-bed dry. They have been placed from 30 to 40 feet apart, extending from the middle of the road-bed to the gutters and opening alternately on opposite sides of the road.

It is essential to have good drainage and also to use gravel enough to make a solid road-bed that will carry the load. We have used from 3 to 6 inches, depending on the character of the foundation soil and the amount of gravel in the old road-bed. The road has been thoroughly rolled with the steam roller to compact it before applying the binder.

After completion, any weak spots that show up from use are carefully mended with pea-stone and cold patch material. Each year a surface coat of the binder has been applied where needed, at the rate of ¼-gallon to the square yard, and covered with coarse, sharp sand.

From 1915 to March 1, 1921, the town has expended $66,875—or about $4,154 per mile—for construction and maintenance of its 16.1 miles of road. Practically all of this road is now in first-class condition and sustaining a heavy and increasing traffic. It is felt that we have gone a long way toward solving the problem of furnishing good roads for the town at a price that any small town can afford to pay for an all-year-round road.

Last year snow was removed from the streets so that automobiles and trucks could be used at all times.

The Adequate and Attractive Lighting of City Streets
Part II

By L. A. S. Wood

Classification of Streets for Ornamental Lighting

IN many of the larger cities will be found some exceptionally wide and important streets which will require special treatment; in general, however, for the purpose of determining the correct size of lamp with the best spacing and mounting height, the streets may be divided into three classes: (1) important business streets, (2) side streets, and (3) residence streets. The following table gives approximate data on this subject, which, however, may be varied to meet local requirements:

Type of Street	Size of Lamp in Lumens*	Spacing in Feet	Mounting Height in Feet
Important business	6,000 to 15,000	50 to 75	12.5 to 15
Side	2,500 to 4,000	75 to 100	11.5 to 13.5
Residence	1,000 to 2,500	150 to 250	10.6

* A lumen is equal to ten times the candle-power rating.

In the important business streets and side streets, the ornamental posts should be set symmetrically opposite each other on either side of the street, while in residence districts the posts should be staggered.

For exceptionally wide and important streets, a greater intensity of illumination is required, with higher mounting, and, for this purpose, two-light ornamental posts, for use with 15,000 and 25,000 lumen lamps, have been developed.

The Use of Trolley Poles as Lighting Units

On streets where trolley poles are in service, the best method of lighting is by the use of ornamental trolley brackets with suitable lighting units, either with single or double arm, which may be attached to the trolley poles, presenting a very attractive appearance and eliminating the necessity of cluttering up the streets with additional posts.

Another method of adapting trolley poles as ornamental lighting units is to encase the pole in an ornamental cast iron shell with ornamental brackets attached. An attractive unit has been designed with double brackets immediately below the trolley span wire and a single light at the top. The span wire is attached to the trolley pole through a hole provided in the capital of the top lighting unit.

A COMBINATION LIGHT STANDARD AND TROLLEY-WIRE SUPPORT USED IN SALT LAKE CITY, UTAH

Types of Commercialized Ornamental Posts

Ornamental posts may be divided into three classes: cast iron, concrete, and pressed steel.

The earliest ornamental cast iron post the history of which is preserved was installed in the Taj Mahal, Delhi, India, upwards of 1,600 years ago, and stands to-day a monument to the durability and lasting qualities of cast iron. Cast iron posts will not corrode, neither will they chip or crack under extremes of temperature. They are designed to withstand severe shocks, such as might be received in ordinary street traffic, and present the slender and graceful appearance so desirable in ornamental street lighting units.

Concrete is one of the most durable materials used in construction work, but it has been found that ornamental posts of this type must be of very heavy and substantial construction to withstand extremes of temperature. Unless manufactured with the greatest care, concrete posts may chip and crack in northern climates.

Pressed steel posts generally consist of a shaft of corrugated pressed steel, mounted on a cast iron foundation, with an iron capital, the whole bolted together with three tie rods passing through the center of the shaft.

The Mazda "C" Lamp

Until about the year 1913, the filaments of all commercial electric incandescent lamps were operated in bulbs from which practically all the air and gases had been removed. The evacuation of the bulb accomplished two purposes, viz., it prevented the filament from being consumed by the oxygen of the air and also prevented the loss of heat by convection. As the temperature of the filament is raised, the light emitted increases much more rapidly than the energy consumed, but, on the other hand, the rate of evaporation of the filament is increased.

In the Mazda "C" lamp, the rate of evaporation is reduced by the introduction of inert gases into the bulb, thus permitting the use of a higher operating temperature. Convection losses are reduced by the use of a concentrated type of filament, and this renders the use of the Mazda "C" lamp specially suitable for street lighting purposes.

Constant-Current Series Circuits

Alternating-current series arc lamps were operated on circuits of either 6.6 or 7.5 amperes and, in consequence, series lighting regulating equipment designed for these ratings became standardized throughout the country. Series incandescent lamps were made for use on these circuits in ranges of from 60 to 1,000 candle-power, but the larger size lamps did not come into commercial use until the high-efficiency Mazda "C" lamps, operating at 15 and 20 amperes, were introduced. These lamps, owing to the increased size and rugged construction of the filament, have a longer lamp life than the straight series type and are generally adopted for ornamental street lighting systems, except in residence districts.

Since the standard rating of series alternating-current circuits is either 6.6 or 7.5 amperes, individual auto transformers to step up from the line current to that required by the lamp have been designed, and these are generally mounted in the post top, immediately below the socket. In cases where a safety coil is installed in the base of the post, the auto transformer is omitted and the safety coil serves as the step-up transformer.

The Light Unit

The problem of street lighting is not like that of lighting a room where the ceiling and walls reflect the undirected light, and provision should be made in the lighting units to direct the light emitted above the horizontal to the plane of illumination. With ornamental post lighting, however, it is desirable that a small amount of light from the upper hemisphere should be directed against the fronts of adjacent buildings, and that glare should be, as far as possible, eliminated.

Glare, within the range of vision of the pedestrian or vehicle driver, should always be avoided. It causes the pupil of the eye to contract in an effort to protect the delicate mechanism of the retina, preventing the observer from seeing as well as he would be able to do with a light source of lower intensity, but more perfect diffusion. We are conscious of this phenomenon when entering a moving-picture theater from a street flooded with sunlight; at first no details can be seen, but gradually, when the

MODERN RESIDENTIAL AND PARK LIGHTING STANDARDS IN USE IN VINCENNES, IND.

eye becomes accustomed to the light, or, in other words, when the pupil becomes dilated, permitting more light to enter the eye, the interior details become visible.

The problem of designing lighting units of high intensity, with a minimum of glare, has been solved by specially designed posts which distribute a flood of light on the streets, with a small amount upwards to illuminate the fronts of adjacent buildings. These units have been developed for "Super White Way" lighting, with 10,000- and 25,000-lumen lamps, and they may be used with smaller lamps, if desired.

With the variety of ornamental street lighting fixtures now available, the possibilities of efficient and artistic city lighting are unlimited.

Norwich University Organizes Bureau of Municipal Affairs

Norwich University, Northfield, Vt., has established within the Department of Political Science a Bureau of Municipal Affairs, which will hold itself ready to give assistance to the counties, cities, towns and villages of Vermont in the solution of problems peculiar to municipal corporations.

The Bureau will render this service in the following ways: by giving information upon request regarding community organization, town planning, and the administration of local government; by publishing and distributing bulletins dealing with problems of government; by encouraging the establishment of local town reference bureaus; by providing communities with speakers on governmental topics; and by holding local government conferences.

K. R. B. Flint, Professor of Political Science, will be director of the Bureau, and to him should be addressed all communications.

Translation of a Notice Printed in French and Flemish and Posted in Many of the Public Parks and Squares of Brussels

> *"The trees give us shade as the plants and flowers give us the joy and the beauty of the country. To break or destroy trees and plants is to do damage to oneself."*

With such an appeal, is it any wonder that the people of Brussels, old and young, respect the natural beauties of their parks and squares?

—STEPHEN CHILD, Fellow American Society of Landscape Architects.

Long-lived Brick Pavements

Pavements Over 100 Years Old in Use in Holland

THE United States is accustomed to brick pavements which have endured over a generation in service and which still continue to bear traffic economically. Carbondale, Pa., has one 32 years old; Alliance, Ohio, 31 years old; Sedalia, Mo., 29 years of age; Olean, N. Y., 25 years. These are typical instances of longevity.

The first brick pavement of record in this country was laid about 1870 at Charleston, W. Va., and it lasted for many years. In those days paving brick as such were not manufactured, and the Charleston pavement was made of vitrified brick originally made for other construction. But they demonstrated the feasibility of brick pavements, and the brick pavements of to-day in our country have their origin in this beginning.

The United States was not the first country in modern times to lay brick pavements, despite its brick-paving history of more than a half-century. For instance, Holland's experience with brick pavements goes back to the time of Napoleon. In Holland, as in the United States, the brick used were vitrified, as are paving brick to-day.

Although no scientific work deals with pavements as they were developed there, several popular authors on travel discuss these pavements in their works.

B. E. Stevenson, in his "Spell of Holland," says:

"For brick, brick, brick are everywhere—overhead and underfoot, on edge in the roadway and piled into great walls and massive towers. It would almost seem that the Dutch had dug away most of the ground beneath their feet in order to convert it into paving and building materials."

William Elliot Griffis, in "Brave Little Holland and What She Has Taught Us," writes:

"After the Romans left and the barbarians triumphed, brick-making became one of the lost arts. In the Rhine delta, the Dutch revived the art of moulding clay into oblong forms and baking them into stone. Their material lay at hand in the rich beds deposited during centuries in the sluggish river bottoms. They made brick houses, walls, pavements and road-beds.

"So hard are the Dutch bricks burned that the common name is 'Klinker.' Many of them have defied the teeth of time for ages."

First-hand information on how the Dutch made their paving brick, with technical data which might tell the secret of the wearing qualities of their brick pavements, has only recently been secured. William C. Koch, Vice-President and General Manager of the Twin City Brick Company, of St. Paul, passes the story along from his father, who manufactured brick in Holland many years ago.

The paving brick with which the old

A BRICK ROAD IN HOLLAND IN USE OVER 100 YEARS

roads were built was made of surface river-clay, sanded and close set in up-draft kilns with permanent side-walls and large arches underneath for the burning of peat. The brick were brought to the vitrification point in the center and heated to a degree which made them so soft that the openings between them as set were completely filled in. The brick retained their shape by mutual support, and their separation was possible only because of the sand which was used in setting them.

The type of brick proved to be very good paving material, and paving was done at a very low cost, not to be compared with that of American brick paved roads involving foundations, fillers, etc.

In the burning there is produced about 20 to 40 per cent of pavers, 20 to 30 per cent of semi-vitrified clinkers, 20 per cent face brick carefully selected as to color, and the remainder discolored hard and soft commons.

Some of the brick roads are 200 years old. This type of road in Holland was begun in sandy-soil districts where traffic on the natural soil was otherwise impossible. A large number of these roads built during Napoleon's time are still in existence and in good condition.

This Lantern Will Not Blow Over

By Albert Marple

MUNICIPAL officials or employees of public service corporations who have had any experience with street or highway work, or with any other work that requires the placing of lanterns at night, realize that it is quite a job at times to keep the lanterns from tipping. Very often the workman whose duty it is to place the lanterns in positions in which they will warn pedestrians and motorists of danger points may do his work faithfully, but that is no assurance that the lanterns will stay upright throughout the night. A strong wind may arise that will tip one or more of them over, extinguishing the light and leaving conditions right for a damage suit against the municipality or company that is doing the improvement work.

The danger of trouble from this source is greatly minimized by the adoption of the idea shown in the accompanying illustration. This consists of the use of a small concrete block, in which has been embedded the bottom or oil reservoir of the lantern. The concrete block makes the lantern practically untippable.

To make the block, a form of lumber 8 inches square and about 4 inches deep is made. A portion of the concrete is placed in the bottom of the form, and upon this, in the center, the lantern is placed, care being taken to see that the oil filler cap is above the top of the form. The remainder of the form is filled with concrete, completely covering the oil reservoir as high as desired. It should be made sure, however, that the oil cap and the thumb screw by which the wick is raised are readily accessible.

THIS LANTERN STAYS UPRIGHT—AND IS INCONVENIENT TO STEAL

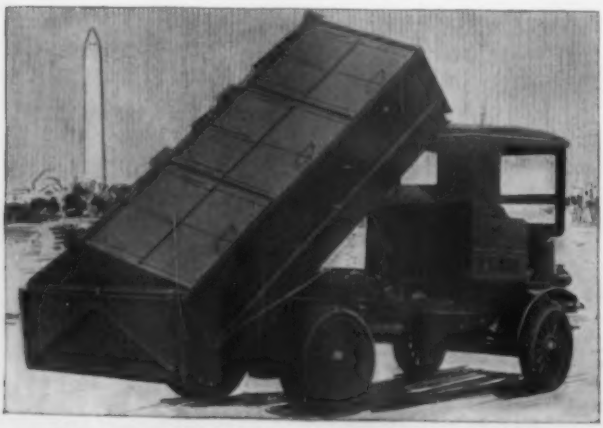
The Economy of Garbage Equipment in Washington, D. C.

A Heavy-Duty Motor Truck with Special Body and Sectional Lids Meets All Requirements

THE City Refuse Division of the District of Columbia put into operation in July, 1921, a heavy-duty dump truck which in its first 3½ months traveled 3,250 miles and hauled about 1,575 tons of garbage. An accurate record has been kept of the gasoline and oil used, and, considering that the truck engine is running practically all the time because of the large number of stops required, the miles per gallon has been very satisfactory, according to J. D. Murray, Master Mechanic of the Division.

DUMP TRUCK SHOWING SECTIONS WITH COVERS RAISED

The sanitary body of the truck is made entirely of steel and is water-tight. It is equipped with sectional hinged lids which are close-fitting and which make it unnecessary to expose more than a small space when loading the truck along the street. The body is fitted with a running-board, so that the operators can readily load from the top. The running-boards are arranged to fold up against the side of the body when not in use. The truck has a capacity of 200 cubic feet, or 5 tons. The inside dimensions of the body are: length, 138 inches; width, 78 inches; height, 24 inches at the sides and 16½ inches from the top of the side to the peak of the triangle.



GARBAGE COLLECTION TRUCK IN DUMPING POSITION

This Autocar garbage truck in ordinary use carries three men in addition to the driver, and it is filled to capacity several times each day. It operates principally around the market and in the rear of big hotels, boarding-houses and other places from which large amounts of garbage must be removed daily.

What Is a Road Survey?

Various Types and Definitions Used by the Layman and the Engineer

THE term "road survey" as commonly used by the public includes almost anything from a trip on horseback over a road, to the most exact measurements for the location of a costly bridge. The State Highway Commission of South Carolina has outlined this subject in an interesting manner in its report for the year ending December 31, 1920, from which the following material has been prepared.

Surveys may be divided into three classes on the basis of amount of detail necessary, namely: surveys for roads constructed without Federal Aid; surveys for Federal Aid roads; and surveys for large bridge projects. The ultimate aim is the same, however, in all—the securing of the most serviceable, and at the same time the most economical, location or site.

Even the simplest road survey involves consideration for: the probable future kind and volume of traffic; the probable future development of the adjacent land, such as its being drained by dredging or filling-in to provide building sites; the type of surfacing to be used at present and that likely to be required later; the proper provision for handling both the surface water and the subdrainage; the connections with other roads; proper grades to join with existing bridges that are to remain in place; the car tracks, water-mains, sewers, etc., that may be encountered; the elimination of railroad grade crossings; the avoidance of dangerous curves and excessive grades; and last, but not least important, the cost of construction. Not only are the factors enumerated of value within themselves, but several of them also affect the cost of future maintenance of the road. Besides all these things, the engineer must consider the conveniences and, oftentimes, the whims of the property owners along the road. There is frequently great temptation to follow the line of least resistance, usually an old, crooked, badly washed road, rather than antagonize a landowner.

After going over the route to be surveyed, trying to balance properly the aforementioned factors, the actual staking out, or "survey," is begun. Stakes must be set at each 100 feet, and additional stakes at humps or noticeable depressions, on the banks of ditches and streams, etc. The curves must be figured and the stakes set on what will be the center line of the finished road, so that the amount of earth to be removed can be figured. The position of property lines, near-by houses, railroad tracks, fences, canals, streams, telephone and telegraph poles, woods, etc., must be noted and sufficient measurements taken to enable such objects to be shown properly on the plans. Certain of these stakes are "referenced"; that is, their distances are measured from various permanent objects, so that when the road is being built the original lines as surveyed can be found if the stakes have been misplaced.

After these stakes have been set, it is necessary to run levels and cross-sections so as to show elevations, not only of the ground along the center line of the proposed road, but also of the ground on either side for a distance of at least 25 feet. If the survey follows an old road with deep ditches and high banks, it becomes necessary to take a great many elevations in order to be able to compute the amount of earth moved in grading.

Since an error in these levels at one place might affect all the road beyond that point and cause an error of many hundreds of yards in computing the amount of grading, or cause the construction of a bridge too low or higher than required, it is necessary to check the levels. This is usually done by running another independent line of levels called "bench levels," which check against the profile levels at numerous points, in much the same way as one checks an adding machine slip against the original column of figures. This is the reason that a survey party must go over the line a second or third time.

A single survey party is usually composed of three men sent out by the Department and two furnished by the county. The chief-of-party studies the route, selects the location, sees that the party sets the stakes at proper points, checks the calculations and notes made by the instrument men, makes recommendations as to proper sizes and locations of culverts and bridges, makes a

daily report to the office of the Department, and arranges for board, lodging and transportation for the party. His object is to secure the best route feasible, giving due regard to the factors indicated above. In difficult situations and in cases of protest by property owners he calls upon the chief-of-surveys, who in turn takes up with the State Highway Engineer such matters as cannot be adjusted in the field.

Municipal Tax Exemption Stimulates Home Building

FIGURES for the first seven months of tax exemption in New York demonstrate the efficacy of this plan for stimulating home building.

The Special Housing Session of the State Legislature in September, 1920, passed an act permitting municipalities to grant such exemption for dwellings, except hotels, from April, 1922, to April, 1932. Such dwellings must have been completed after April 1, 1920, or begun not later than April 1, 1922. Although strong arguments for the law had been advanced before the Legislature, only a few municipalities showed their appreciation of its advantages by passing the necessary local ordinances. They were Malone, Beacon, Saratoga Springs, Plattsburgh, Little Falls, and New York. In an address before the joint meeting of the National Municipal League and the American Civic Association, Raymond V. Ingersoll, Secretary of the City Club of New York, gave the following important information:

Effect on Building

Most of the up-state municipalities where this experiment has been tried report that home building has been noticeably stimulated. In New York City the results have been specially marked, and this in spite of unfavorable labor and mortgage conditions. Lawson Purdy, formerly President of the National Municipal League and a leading New York authority both on housing and on taxation, says:

> "In seven months houses have been planned to accommodate over 38,000 families. If this rate of progress continues, 260,000 persons will be provided for in a year. This is about three times the rate of growth of the city."

The present rate of building is more than four times that of last year.

Of the provisions for 38,000 families already referred to, 22,704 are in one- and two-family houses, which represents a complete reversal of the old ratios of such houses to tenement apartments.

Figures taken from the *Real Estate Record and Guide* of November 5, giving the valuations of contracts actually awarded, show that, whereas in 1920 the aggregate for new business buildings exceeded by more than 25 per cent the total for residential buildings, in 1921 the total for residences has been more than three times as great as the total for business purposes. As against housing contracts awarded for the entire twelve months of last year, amounting to $81,650,200, we have contracts during ten months of this year—including only seven months under tax exemption—amounting to $195,933,400. That the pace has been accelerating is made evident by the fact that in October alone housing contracts were made aggregating $41,265,400. The figures for floor space are still more impressive. For the year 1920 the total contracted for was 15,142,000 square feet. For the first ten months of 1921 it was 41,638,800 square feet.

Effect on Vacant Lots

One of the incidental results of the exemption has been a very great activity in the sale of vacant lots. Most of these lots are reasonably near the rapid transit lines. A year ago there was no market for them, but now they are being auctioned off by the thousands at moderate prices. Where formerly the chief selling point featured by the agents was the possibility of profits through a rise in land values, now the advantage advertised is the opportunity to build a home and to secure the exemption. An unusually large proportion of the new houses now being built are for occupancy by the owners. Thousands are seeking escape from the tenements. From a social point of view it is the healthiest movement in housing that has taken place in New York City in some years.

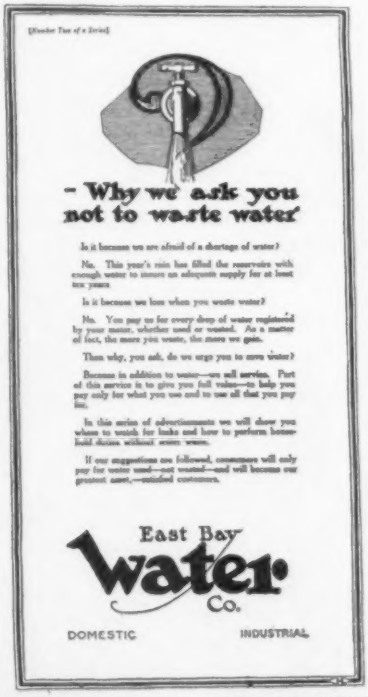
Water, Water Everywhere—Yet It Can Be Advertised

Newspaper Campaign Keeps Public Sold on Service Received, Even When Rates Are Raised

By Hugh E. Agnew

DID you ever see water advertised? Not seltzer water, or any of the medicinal waters, or mineral water for bathing, or even fresh spring drinking water, but just plain H_2O for use in the bathtub, to wet down the lawn and wash the flivver? These campaigns are unusual and infrequent, but they have occurred. A few have not been mere "Notices," but well-arranged, extensive campaigns. Besides showing another instance of the almost unlimited application of advertising, one of the latest of these campaigns is particularly suggestive of advertising possibilities for those whose product is in the nature of a monopoly.

The East Bay Water Company of Oakland, Calif., which furnishes the water-supply for that city and for Berkeley, Alameda, Piedmont and Richmond, comprising a population of more than 300,000 people, was the advertiser. It was a newspaper campaign in which the daily papers of San Francisco and the cities named were used from May, 1919, to January, 1921.


[Another Two of a Series]

- Why we ask you not to waste water

Is it because we are afraid of a shortage of water?

No. This year's rain has filled the reservoirs with enough water to insure an adequate supply for at least ten years.

Is it because we lose when you waste water?

No. You pay us for every drop of water registered by your meter, whether used or wasted. As a matter of fact, the more you waste, the more we gain.

Then why, you ask, do we urge you to save water?

Because in addition to water—we sell service. Part of this service is to give you full value—to help you pay only for what you use and to use all that you pay for.

In this series of advertisements we will show you where to watch for leaks and how to perform household duties without water waste.

If our suggestions are followed, consumers will only pay for water used—not wasted—and will become our greatest asset,—satisfied customers.

East Bay Water Co.

DOMESTIC INDUSTRIAL

THIS KIND OF ADVERTISEMENT CREATES GOOD-WILL BY HELPING CUSTOMERS "USE ALL THE WATER THEY PAY FOR"

The first messages pertained to the saving of water in the house—in which there was a double purpose. It was a subject which would get the immediate attention and sympathy of the women. Then, it followed an exceptionally dry period, in which the supply of water had been inadequate because of shortage at the source. During the summer of 1918 the use of water for lawns was prohibited in the "East Bay cities," as the municipalities on the east side of San Francisco Bay are called, and the water company could easily interest residents in that subject, as all were anxious to prevent another shortage.

The campaign opened with a full page showing a stream of "domestic" and "industrial" water pouring from a main. The title in large, black, hand-lettered type was just "Water." "When a group of people having a common interest live in the same place under the same laws and regulations," it read, "these people constitute a community. Whenever a community exists, community problems arise. These community problems explain and account for the public service corporations — companies organized to render service essential to the general public health, or convenience, or both; in other words, companies organized to solve community problems. The most important of these is the question of an adequate water-supply." Then followed a brief statement of some of the topics that would be discussed in the series of advertisements which were to follow.

Selling Water Economy

The first of these was wastage of water in the home. The water company assured its readers that this was urged, not because of fear of another shortage, but "because in addition to water we sell service. Part of this service is to give you full value—to help you pay only for what you use and to use all that you pay for."

Various means of preventing waste were discussed, such as leaks in taps, using running water for rinsing potatoes while peeling them, allowing children to play with the hose, etc. Each formed the subject for one message. By the time this series was completed the summer was nearly over and people had ceased to think much about water shortage. Also many who had taken occasion to complain about the size of their water bills had discovered various means of reducing them. If they did not care to take the trouble to prevent waste, they had that guilty feeling which prevented complaint, either at the office or to neighbors.

The next phase of the campaign was devoted to the general subject of making the water-supply clean, safe, pleasing to the taste and to the eye, and free from all impurities. This series included a discussion of collecting or "warehousing" the water. Pictures of the various reservoirs were given and means of protecting the source described.

That iron water-mains cost $8 a foot, that running water usually does not "purify itself," but tends to collect impurities as it flows, how watersheds are guarded and wooded, the duties of the patrol, and a map of the thirty-five square miles owned or controlled by the company for collecting water, were some of the subjects discussed in the second period of the campaign.

Being a public utility, it was the purpose of the company to keep the public sold as thoroughly as possible upon the service which the company gave. An important part of that was to explain as fully as possible the nature and extent of the service of supplying water.

There are always a lot of agitators whose chief sport—both indoors and out—is to attack public service corporations. The fullest possible understanding of the business of furnishing a public service to a city will probably do more than any other one thing to forestall dissatisfaction that might be created by these agitators.

The amount invested in the watersheds and why that investment influenced water rates were explained as part of the general understanding of the water business. The difficulty and expense of elevating 2,000,000 gallons of water 800 feet daily, which is done at Alvarado and Lake Chabot, was graphically illustrated. The difficulty of repairing and replacing broken water-mains quickly was pictured.

The elaborate and expensive measures taken to keep the water pure and healthful were explained in another series, one of which discussed water analysis and how in addition to the company's own laboratories both the city and the state health departments made analyses. The little algæ which were sometimes found in the water as it came from water taps were shown to be harmless, being a vegetable which grows so rapidly that it "can be seen with the naked eye within forty-eight hours." Filtration was explained. Also the Government report, which gave Oakland the lowest percentage of sickness from typhoid of any city in the country, was featured in the advertising copy. The care with which the water-supply was handled was given its full share of credit in the advertising, as infected drinking water is the most common source of typhoid contagion. The chlorine process of sterilizing the city water was so described that any child could understand it.

Another step in this campaign to keep customers sold on the service they were receiving was a detailed discussion of the company's method of supervision. Why the water company is under the jurisdiction of the State Railroad Commission was the subject for an advertisement, two columns thirteen inches. The similarities of the railway and the water-supplying business were pictured, and the public service idea was illustrated in a number of other advertisements of generous space.

The various units of the water company's plant were discussed in the series on supervision, and reasons given for the particular construction. The saving effected by a water tunnel from the San Pablo reservoir to the filter plant in the Berkeley Hills was the subject of another message. How the company was looking ahead to the development of the beautiful residence district north and east of Lake Merritt indicated its far-seeing alertness in providing for the city's growth. The water company did not

want its customers to think it short-sighted, so it frankly discussed in detail this and other improvements and additions. It called attention to the difficulty of furnishing water to the homes in the hill districts hundreds of feet above the bay.

Economies in meter reading, the cost of collecting bills, the saving effected by modern office equipment, were all adequately presented. The water company—it was evident from its advertising—was an enterprising, well-managed institution, of which its customers might well be proud.

Creating a Friendly Feeling

Of course the copy was too adroitly written to mention such a thing, even indirectly, but when a customer knew the business so intimately, as all must have known it after following its advertising for eighteen months, he would almost inevitably have a feeling of friendly sympathy for an institution which was trying so hard to please—rather than a hostile, critical attitude which is so commonly felt toward the privately owned public service corporations.

Finally, to round out the campaign and add the human touch, the work of various employes was described, the employe named, and the length of time he had been engaged in keeping the city's water-supply adequate was given. "An hour-and-a-half shut-down in two years," the reader was told, "was the record made during the water crisis of 1918, by Charles H. Harry, in charge of the seventy-eight wells of the Fitchburg pumping station."

With the prices of everything else going up, it was only natural that people would have to pay more—slightly more—for the important service of having their water needs supplied. The increase in the cost of water was but 12 per cent. Other commodity prices had increased 98 per cent. It was evident that the water company had again shown its skill in management to keep down the increase to so little as 12 per cent. That was an added reason for pride in the concern—rather than criticism of it and a grudging consent to the added cost.

The space used was liberal, from two-column-ten to full page. The form of the display changed from time to time, as well as the subject matter. That was to avoid monotony. The signature, however, formed a sort of connecting link between the different numbers of the series. It was hand-

Algae is harmless
Algae is pronounced "Al-gee." It is not a boy's name; and it is not bacteria.
Algae is a vegetable growth. It forms in reservoirs, lakes, and streams, and grows large enough within forty-eight hours to be seen with the naked eye.
If particles of Algae should pass through the mains from the distributing reservoirs into your drinking water and taste rather suspiciously: if it looks a bit doubtful, remember it is not harmful. It is a vegetable growth, purely.
As harmless as Algae may be, it is still unpleasant to some, and this company is now covering its distributing reservoirs to keep the sun's rays from the water. Thus protected, stored water will be free from Algae.
Covering our large reservoirs is rather a costly undertaking, but you are entitled to drink water without little mental photographs of doubtful character—so we're putting the "lid" on the reservoirs, keeping the sun out and stopping the formation of Algae.
East Bay
Water
Co.
DOMESTIC
INDUSTRIAL

MOST CONSUMERS WHO READ THIS ADVERTISEMENT NEVER SAW THE ALGAE, BUT THEY WERE PREPARED FOR SUCH AN INCIDENT. IT KEPT THE CUSTOMER SOLD ON SERVICE

lettered and of the same type style as that of the word "Water" in the first announcement. As the incorporation is known locally as the "Water Company," the display of the signature was so arranged as to emphasize that part of the name.

The general effect of the advertising, as expressed by a prominent real estate man of the district, has been to create so much goodwill for the water company that no agitator or intriguing politician could stampede the public into forcing an issue with the East Bay Water Company.

ACKNOWLEDGMENT.—Reprinted by courtesy of *Printers' Ink*.

"Sharp Turns"

By James W. Brooks

The people themselves can do much towards keeping highways clear of graft by tearing up political weeds along roads in their own neighborhood.

Using the road to pay political debts makes a rotten subgrade in the public mind for further highway development.

—American Highway Educational Bureau.

Our Dangerous Schoolhouses

The Fire Losses in Schools and the Existing Fire Peril

WITH the great publicity that has been given to the fire peril existing in the New York City schools, considerable attention is being directed towards the dangers to which school children are subjected through laxity in observing fire department regulations in many cities. The New York report covers conditions as presented by the Meyer Legislative Committee and states that of the 695 schools in the five boroughs, 496 have violations of fire department regulations filed against them, although some of the violations doubtless were of a minor nature. In the course of this period, over 50 fires occurred in the school buildings, and thousands of lives were jeopardized. Fire drills are credited with having prevented any fatalities.

Unfortunately, the situation in New York City is not exceptional. Many educational structures throughout the country are in a deplorable condition. One authority has stated that "over 90 per cent of our school buildings are potential death traps," the opinion referring to national conditions. Fortunately, there is evidence from time to time of local awakening.

The Chamber of Commerce of Holyoke, Mass., for example, recently took steps to bring about the installation of sprinkler systems in the city schools as a measure of safety.

Statistics compiled by the National Board of Fire Underwriters through its Actuarial Bureau show that there are, on the average, day in and day out through the year, about 5 school fires, which, of course, are of varying degrees of seriousness. Recorded schoolhouse losses in the United States during the four years of 1916 to 1919, inclusive, amounted to $19,846,038. This figure, however, covers only property on which losses were paid by members of the Actuarial Bureau of the National Board of Fire Underwriters, and if 25 per cent be added to it to allow for unreported fires and those in uninsured structures, the total would very nearly reach

FIRE LOSSES IN SCHOOLS

Including Those in Universities, Boarding Schools, Convent Schools and Academies

STRICTLY PREVENTABLE CAUSES

Causes	1919 Losses	1918 Losses	1917 Losses	1916 Losses
Defective chimneys and flues	$556,427	$353,851	$301,365	$430,370
Fireworks, firecrackers, etc	18,986	36	31,455	....
Gas, natural and artificial	33,659	36,166	28,987	65,292
Hot ashes and coals, open fires	77,391	63,579	37,501	32,277
Ignition of hot grease, oil, tar, wax, etc.	980	1,259	70	261
Matches—smoking	197,061	250,408	259,287	204,726
Open lights	396,561	10,423	8,454	49,414
Petroleum and its products	85,032	26,552	14,632	118,235
Rubbish and litter	2,871	19,328	33,937	22,350
Sparks on roofs	316,588	265,909	239,046	133,091
Steam and hot water pipes	14,529	50	1,008	25
Stoves, furnaces, boilers and their pipes	523,469	645,595	645,725	464,814
Total	$2,223,464	$1,673,156	$1,601,468	$1,520,855

PARTLY PREVENTABLE CAUSES

Electricity	$472,853	$559,068	$506,632	$585,054
Explosions	35,094	5,890	76	2,469
Exposure (including conflagrations)	117,260	488,659	156,877	268,573
Sparks from machinery (friction)	51,751	6,952	110	6
Incendiarism	162,735	180,662	32,787	428,364
Lightning	78,643	193,225	199,780	61,811
Miscellaneous known causes	57,652	135,090	73,758	85,050
Sparks from combustion	14,258	3,829	27,865	4,708
Spontaneous combustion	165,147	302,769	335,130	449,697
Total	$1,155,393	$1,876,145	$1,342,974	$1,885,732
Unknown (probably largely preventable)	2,494,788	2,026,840	1,114,120	981,103
Grand total	$5,873,645	$5,576,141	$4,058,562	$4,387,690

$25,000,000, all of which represents wasted labor and material. Furthermore, these fires endanger thousands of young lives.

It will be observed from these statistics that the loss of $5,873,645 in 1919 was the largest in the four years, and that only in one period, 1917, was a decrease from the preceding twelve months shown.

There was a considerable increase in 1919 in the destruction due to defective chimneys and flues, fireworks, firecrackers, and open lights as compared with 1918. Electricity losses, however, displayed some improvement, and the same was true of those resulting from exposure, lightning and spontaneous combustion. The heaviest damage in 1919, $556,427, was charged against defective chimneys and flues, whereas in 1918 stoves, furnaces, boilers and their pipes held first place. It is evident from the tabulation just below that the heating plant as a whole is the chief hazard in schools.

How Some Schools Are Well Protected

Investigation of school fires where there was a considerable loss of life, almost universally uncovered the fact that the tragedy was occasioned by panic and not by the fire itself. In the well-known fire in the Hochagela School in Montreal, the Peabody, Mass., fire and the Collingwood, Ohio, fire it was panic rather than fire that caused the appalling loss of life. Lately there has been a more universal appreciation of this fact, and school authorities who have investigated it have come to the conclusion that the organized fire department is about the only effective means of handling panic and preventing extensive loss of life. Many cities throughout the country have for this reason installed fire alarm boxes in every school, so that firemen may be called at once.

It is, of course, impractical to tear down 80 per cent of the schools of the country and immediately erect in their places modern fire-proof buildings. There are, however, certain steps which can be taken to make schoolhouses safer, one of which is the all-important installation of a fire alarm box on or within every schoolhouse in the country. Following is an honor roll of cities in which every schoolhouse is protected by a fire alarm box.

Alameda, Calif.
Tulare, Calif.
Naugatuck, Conn.
Winsted, Conn.
Jacksonville, Fla.
Augusta, Ga.
Nampa, Ida.
Oak Park, Ill.
Hammond, Ind.
Clinton, Iowa.
Rumford, Me.
Belmont, Mass.
Beverly, Mass.
Boston, Mass.
Cohasset, Mass.
Everett, Mass.
Fall River, Mass.
Holyoke, Mass.
Marblehead, Mass.
Newton, Mass.
Quincy, Mass.
Reading, Mass.
Salem, Mass.
Sharon, Mass.
Swampscott, Mass.
Walpole, Mass.
Harbor Beach, Mich.
Cloquet, Minn.
Anaconda, Mont.
Goldfield, Nev.
East Orange, N. J.
Nutley, N. J.
Passaic, N. J.
Union, N. J.
Union Hill, N. J.
Buffalo, N. Y.
Cortland, N. Y.
Flushing, N. Y.
Harrison, N. Y.
Ithaca, N. Y.
Malone, N. Y.
Niagara Falls, N. Y.
New York, N. Y.
Rochester, N. Y.
Syracuse, N. Y.
Utica, N. Y.
Walden, N. Y.
Watertown, N. Y.
Conneaut, Ohio.
Warren, Ohio.
La Grande, Ore.
Pendleton, Ore.
Forty-Fort, Pa.
Beaver Falls, Pa.
McKeesport, Pa.
West Newton, Pa.
Woonsocket, R. I.
Columbia, S. C.
Salt Lake City, Utah.
Norfolk, Va.
Spokane, Wash.
Ashland, Wis.
Manitowoc, Wis.
Milwaukee, Wis.
Superior, Wis.

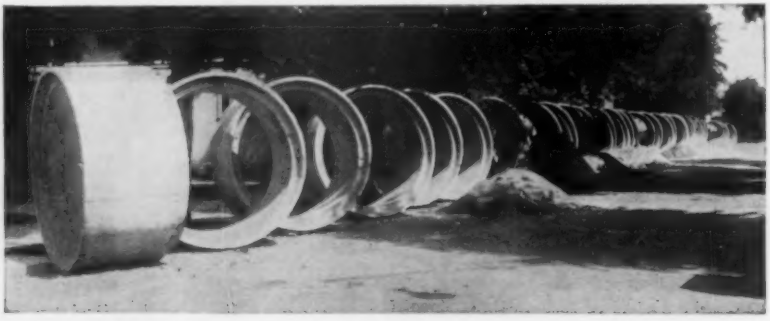
Rollin Kirby in the New York World.

IN VIEW OF THE MANY SCHOOLHOUSE FIRES, WILL IT COME TO THIS?

The Laying of Concrete Pipe Sewers

CONCRETE pipe, both plain and reinforced, are now being extensively used in all parts of the country for building storm and sanitary sewers. It is not definitely known how early concrete pipe were used for this purpose, but such records as are available indicate that they have been giving excellent service since 1873 in many parts of the United States.

The rapid increase in the amount of concrete sewer pipe laid is evidence that in the opinion of leading municipal engineers its strength, enduring qualities and economy compare favorably with the qualities of other types. The early use of concrete pipe was in sewers of larger diameters; in later years improvements in concrete-pipe-making machinery have made possible the successful manufacture of small sizes which are now equally well received by sewer engineers. Concrete pipe are now made in all standard sizes from 4 inches up to 108 inches internal diameter. They are capable of sustaining the weight of heavy fill in deep trenches or the loads caused by the passage of heavy vehicles when the sewer is near the surface. Because of their impermeability concrete sewer pipe greatly reduce leakage and infiltration.



84-INCH CONCRETE PIPE READY FOR INSTALLATION AT KOKOMO, IND.
Kokomo's first 24-inch concrete sewer pipe was laid in 1873 and is still in service

Designing the System

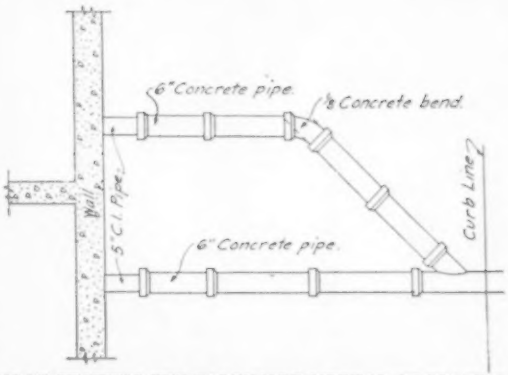
Sewerage systems are designed on two general plans—separate and combined. The separate system provides two separate and distinct sewers, one to take care of sanitary sewage, including domestic and industrial wastes, and the other to serve as a drain for carrying away such surface water as rain, melting ice and snow, and street flushing water. Combined systems handle both sanitary sewage and surface waters in one single sewer. Separate systems are used when conditions make it necessary to treat sanitary sewage in disposal plants. Combined systems are installed if the city is located near large bodies of water into which the sewage can be discharged without danger of contaminating the water-supply of its own or other communities. Which system to use in a particular case depends not only upon the sanitary factors above referred to, but also upon questions of the most economical construction, and is properly left to the determination of experienced sanitary engineers.

In designing sewer pipe lines, provision should be made for the future growth of the city so that the important trunk line sewers will never have to be replaced by pipe of larger size. Many cities are frequently compelled to replace at great expense old sewer lines with larger pipe because the city's growth exceeded expectations.

Special attention should be given to regularity of alignment and gradient of sewers. Irregularities not only cause decreased capacity, but also make maintenance difficult and expensive. In hilly country requiring broken grade lines, the cities served by the sewer system should be divided into districts separated by intercepting or trunk

sewers, thus permitting uniformity of grade and alignment within each division.

Typical methods of placing house connections are presented in the accompanying illustrations. House connections should never be under 6 inches internal diameter and should be laid as straight as possible and on a minimum grade of 2 per cent (¼-inch per foot). The danger of clogging in smaller sizes is so great that the slightly increased cost of the 6-inch connection is justified. Final inspection should be made of each lateral and connection and an accurate location record kept of the Y at the lateral and the end of house connection at the property line. Sketches of any change from original plans should be made and recorded.

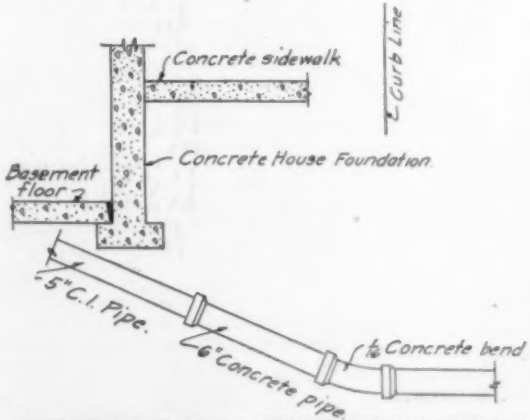


PLAN SHOWING THE BALTIMORE METHOD OF PLACING DOUBLE HOUSE CONNECTIONS UNDER A SIDEWALK

The type of manhole design shown is used to avoid unnecessary excavation where a considerable difference in elevation exists between two lines, and to maintain uniform velocity of flow. A type of concrete block manhole adopted in Terre Haute, Ind., is also shown.

All storm water should pass through a catch-basin like that shown, before entering the sewer, in order to remove silt and other material that would otherwise clog the sewer.

A lamp hole is, as its name implies, an opening through which a lantern may be let down into the sewer line for the purpose of locating obstructions. Such holes are installed by some engineers where manholes are more than 400 feet apart.



METHOD OF PLACING A SINGLE HOUSE CONNECTION UNDER SIDEWALK. UNNECESSARY BENDS SHOULD BE AVOIDED

Construction Methods

The recommended practice for laying sewer pipe, adopted by the American Society for Testing Materials in 1919, should be closely followed in order to insure best results. Extracts are given below.

"The foundations in the trench should be formed to prevent any subsequent settlement and thereby possibly an excessive pressure and consequent rupture of the pipe.

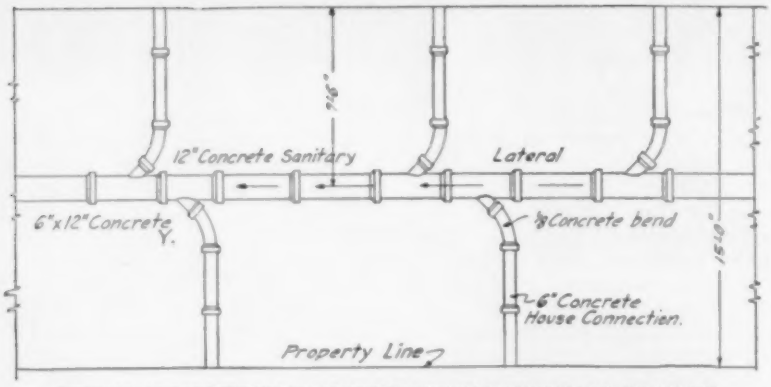
"If the foundation is rock, an equalizing bed of concrete or sand well compacted should be placed upon the rock. The thickness of these beds should be not less than 4 inches. Pipe should be laid in these beds so that at least the lower third of each pipe is supported its entire length.

"If the foundation is good, firm earth, the earth should be pared or molded to give a full support to the lower third of each pipe, and, if necessary to secure a proper bearing for the pipe, a layer of concrete, fine gravel or other suitable material should be placed. The same means of securing a firm foundation should be adopted in case the excavation has been made deeper than necessary.

"If there is no good natural foundation, the pipe should be laid in a concrete cradle supported on a masonry foundation carried to a soil of satisfactory bearing power, or supported on a structure designed to carry the weight of pipe and its load to a firm bearing.

"Trenches should be kept free from water until the material in the joints and masonry has sufficiently hardened.

"To protect pipe lines from un-



TYPICAL ARRANGEMENT OF 12-INCH SANITARY LATERAL IN AN ALLEY
Concrete Y's are used instead of T's, thereby increasing the hydraulic efficiency of the line

usual stresses, all work should preferably be done in open trenches.

"Pipe lines should be placed at a sufficient depth below the surface of the street to avoid dangerous pressure or impact. When this is not possible, special reinforcement should be provided.

"Trenches should be only of sufficient width to provide a free working space on each side of the pipe, preferably not over one-third of the nominal diameter, and never less than 4 inches, according to the size of the pipe and the character of the ground; but in every case there should be sufficient space between the pipe and the sides of the trench to make it possible to thoroughly ram the back-filling around the pipe and to secure tight joints.

"The laying of pipe in finished trenches should commence at the lowest point, so that the spigot ends point in the direction of flow.

"All pipe should be laid with ends abutting and true to line and grade. They should be fitted and matched so that when laid in the work they will form a sewer with a smooth and uniform invert.

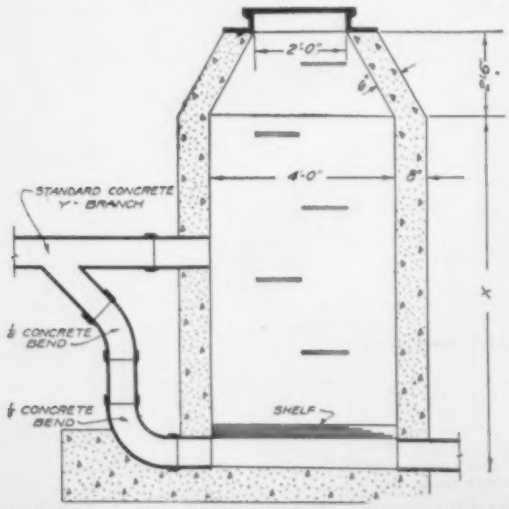
"It is necessary to use all possible care when shoving the pipe together, so that the joints will not be unnecessarily large.

"Sockets should be carefully cleaned before pipe is lowered into trenches. The pipe should be so lowered as to avoid unnecessary handling in the trench.

"The pipe should be set firmly to line and grade and the joints carefully adjusted and filled with the jointing material.

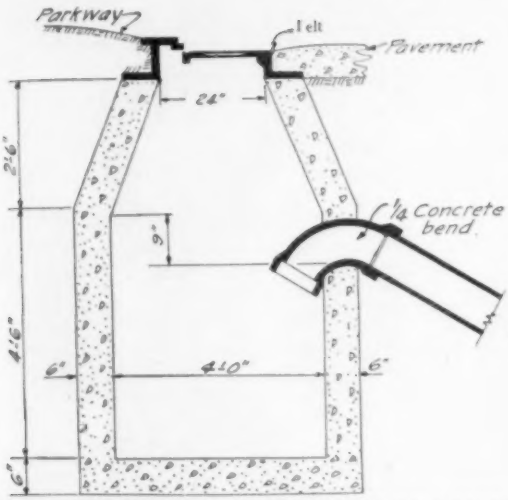
"Joints should be made in the following manner: A closely twisted hemp or oakum gasket of suitable diameter, in no case less than ¾-inch, and in one piece of sufficient length to pass around the pipe and lap at the top, should be solidly rammed into the annular spaces between pipe with a suitable calking tool. When cement joints are used, the gasket should first be saturated with neat cement grout. The remainder of the space should then be completely filled with the jointing materials.

"All trenches and excavations should be backfilled immediately after the pipe is laid therein, unless other protection of the pipe line is directed. The backfilling material should be selected and deposited with special reference to the future safety of the pipe. Clean earth, sand or rock dust should be solidly tamped about the pipe up to a level at least 2 feet above the top of the pipe. This material should be carefully deposited in uniform layers. Unless otherwise permitted, each layer should be carefully and solidly tamped or rammed with proper tools, so as not to injure or disturb the pipe line.

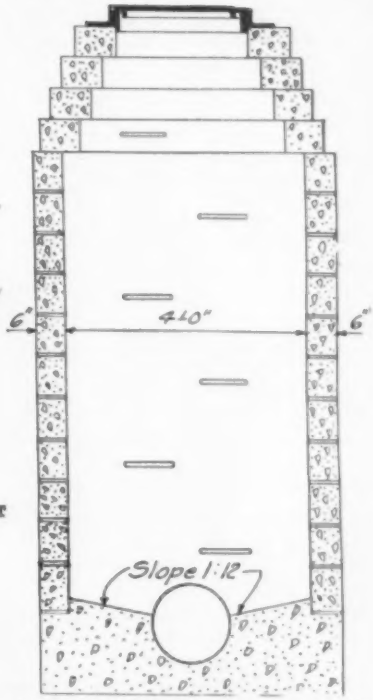


A TYPICAL CIRCULAR CONCRETE SANITARY MANHOLE WITH DROP CONNECTIONS USED TO AVOID UNNECESSARY EXCAVATION

A common method where there is considerable elevation between two connecting lines and to maintain uniform velocity and flow throughout the system



TYPE OF CATCH-BASIN COMMONLY USED TO COLLECT SEDIMENT FROM STORM WATER



VERTICAL SECTION OF CONCRETE BLOCK MANHOLE ADOPTED BY TERRE HAUTE, IND.

"Puddling or water flooding for consolidating the back-filling is recommended only for sandy and gravelly materials. If this method is used, the first flooding should be applied after the back-filling has been compacted by tamping up to 2 feet above the top of the pipe, and the second flooding during or after the subsequent filling of the trench. An excess of water should be avoided, in order to prevent disturbance of the earth under and around the pipe and also to prevent an undue excess of pressure upon them.

"Walking or working on the completed sewer, except as may be necessary in tamping or back-filling, should not be permitted until the trench has been back-filled to a height of at least 2 feet over the top of the pipe.

"The filling of the trench should be carried on simultaneously on both sides of the pipe in such a manner that injurious side pressures do not occur."

Municipal Art League of Chicago Prepares Artistic Post-Cards

The tourist and even the traveling business man will admit that they have often sought vainly for some true expression of the beautiful sights they have viewed in the cities and towns through which they have passed. It is indeed a regrettable fact that few cities in the United States have offered to travelers artistic pictures of the beauties of their respective localities. The average picture post-card sold throughout the country has not satisfied the demand of discriminating people—people who have an appreciative and true sense of artistic values.

The Municipal Art League of Chicago is directing the publication of a worthy series of post-cards of Chicago and vicinity. It is an interesting fact in this connection that this organization was a pioneer in the "City Beautiful" movement. Its prime purpose is to encourage civic art and to oppose influences that threaten to check endeavors in this direction.

The cards selected for reproduction and distribution are mostly prize-winners in a contest conducted by the Chicago Camera Club. There are twenty-four cards in the issue, representing the most interesting and attractive scenes in the city, all done in excellent protogravure.

Bituminous Pavements Laid on Old Macadam Streets in Denver

By J. W. Johnson
Senior Highway Engineer, U. S. Bureau of Public Roads

THE city and county of Denver during the past ten years have paved a number of streets with various types of bituminous surfaces on old macadam bases. The different types laid to date are asphaltic concrete, tar concrete, "Amiesite," sheet asphalt, and "Willite." The first attempt at this construction was made by the city in 1910, when four blocks on Speer Boulevard were paved. Three types of pavement were laid in the following order, each type being used throughout one block: asphalt concrete, tar concrete, "Amiesite," and tar concrete. In 1912 the paving on this street was continued for a distance of eight blocks, using asphalt concrete. In the same year a block on Eighteenth Avenue, from Sherman to Grant, was paved with "Amiesite." In 1913 the block between Sherman and Lincoln on Eighteenth Avenue was paved with asphalt concrete.

In 1916, 1917 and 1918, 35 to 40 blocks were paved with sheet asphalt and asphalt concrete. One block of "Willite" was laid in 1919. In 1920 a total of 112,920 square yards of asphalt concrete and "Willite" pavement was laid.

All the streets paved in this manner had previously been improved by grading, curbing and gutter, and surfacing. The surfacing originally placed varied in different parts of the city. Disintegrated granite, slag, and oil macadam were used.

The width of the streets varied from 30 to 40 feet between curbs. The width of the gutter was usually 2 feet. The crown varied from 8 to 12 inches. All the streets had previously been supplied with storm sewers. Intakes to sewers were provided at intervals, so that the maximum length of run-off of surface water was about 600 feet.

Owing to the light annual precipitation (an average of about 14 inches), the high crown on pavements, and the short distances that surface water has to travel before entering sewers, there is very little opportunity for the subgrade to become wet so long as the pavement is in good condition. Only a very few places where settlement of the subgrade has occurred are in evidence. Practically all these defects occur under the earlier pavements.

With the exception of a small amount of "Willite," all of the 1920 construction was asphaltic concrete, 1½ inches thick on a 1½-inch binder course. Both Mexican and California asphalt, with a penetration of from 50 to 60, were used. The binder course was mixed in the proportion of 50 pounds of asphaltic cement to 250 pounds of sand and 750 pounds of smelter slag (maximum size 1 inch). The surface course was mixed in the proportion of 80 pounds of asphaltic cement to 85 pounds of limestone dust, 300 pounds of slag (maximum size ⅝-inch), and 535 pounds of sand.

The mixing was done at stationary plants, and the material was transported to the job in auto trucks. The mixing plants and trucks are owned and operated by the city. All of the work, including the grading and preparation of the subgrade, is done by the city by day labor. No contracts are let for any portion of the work of this character.

Preparation of Subgrade

The surface of the street selected for paving is scarified by the use of a scarifier attached to a heavy blade machine and pulled by a 10-ton caterpillar tractor. The depth and amount of scarifying depend on the condition of the old macadam and the amount necessary to be removed. As all the streets paved have either brick or concrete gutters, it becomes necessary to remove 3 inches of old material at the junction of pavement and gutter. From this point the amount of material removed is decreased to the center of the road, where only the amount necessary to bring the road to a uniform crown is taken off.

The material loosened by the scarifier is bladed into windrows, about 6 feet wide and 3 feet high, and then loaded into wagons by means of a traveling bucket loader. After the excess material is removed, the roadbed is thoroughly rolled until hard and firm.

REMOVING EXCESS MATERIAL AFTER SCARIFYING AND RESHAPING MACADAM STREET IN DENVER PRIOR TO APPLICATION OF SHEET ASPHALT TOP

All depressions are then filled with good material and again rolled and brought to a uniform grade and cross-section.

Upon this subgrade the asphalt binder course and surface course are laid in accordance with usual practice.

Cost of Pavements

The number of square yards of pavement of this character laid during the season of 1920 was 112,920. The total cost of this work was $127,768.77, which is at the rate of $1.13 per square yard. This price included the grading necessary to prepare the subgrade. The average cost of grading amounted to $0.15 per square yard of pavement. In other words, the pavement cost an average of $0.98, and the grading $0.15 per square yard.

The items of cost of the work done in 1920 are as follows:

Item	Cost per Square Yard
Surface mixture	$0.281
Binder mixture	.210
Fuel	.071
Expense	.010
Tools and sundries	.023
Plant repairs	.030
Depreciation plant	.013
General salaries	.040
General labor	.013
Plant labor	.115
Street labor	.088
Hauling	.086
Total for surfacing	$ .980
Grading	.150
Total	$1.13

The various charges entering into the above items are explained as follows:

Surface and binder mixture include the cost of asphalt, limestone dust, sand and slag which are used in them.

Fuel covers all coal used at plant and on steam rollers on job, and fuel oil in the dryer, and electric power for derrick.

Expense includes insurance, taxes, printing, automobile and miscellaneous expenditures.

Tools and sundries include the purchase of tools and miscellaneous plant supplies, water rental, horse feed and shoeing, lubricating oil and grease.

Plant repairs include repairs and replacements to plant and roller parts; also labor in getting plant in shape before starting up in the spring.

Depreciation is 20 per cent of the cost of new equipment purchased.

General salaries include those of the superintendent, bookkeeper at plant, clerk at administrative office, and an inspector.

General labor includes labor in building addition to plant, assembling derrick and any other work not properly chargeable to operation.

Plant labor includes all labor used in operating the plant.

SPREADING SHEET ASPHALT FOR NEW SURFACE ON RESHAPED MACADAM ROAD

Street labor includes all labor used on the street in laying the binder and top.

Hauling includes the cost of trucks and drivers, and street rollers and operators.

Grading includes all labor in preparing subgrade.

Present Condition of Pavements

The most noticeable defects in the present condition of these pavements are sunken spots, roughness or waves in the surface, and surface cracks. The sunken places are all on work done in 1910 and 1912. The largest of these have a diameter of from 8 to 10 feet, and are possibly 8 to 12 inches below grade. This condition is caused by settlement of the subgrade, which was on a comparatively new fill of from 4 to 10 or 12 feet. The street on which these sunken places occur was built along the bank of Cherry Creek, parallel to new retaining walls built to confine the watercourse of the creek. The surfacing was placed on this fill within two years after it was constructed, and evidently prior to the time of complete settlement.

Roughness and waves are in evidence on a number of streets laid during the early period of this construction. Apparently this condition is caused by insufficient care in laying the pavement, or insufficient rolling of the subgrade. This condition does not exist to any extent in work done since 1916.

Transverse cracks in the pavement laid in 1916, 1917 and 1918 are in evidence throughout a large portion of the work. These cracks are usually at right angles to the center line of roadway. Sometimes they extend entirely across the pavement from gutter to gutter, and sometimes they extend only a distance of 6 or 8 feet each side of the center. Apparently they are caused by contraction and do not indicate any serious permanent defect in the wearing qualities. The distance between them varies considerably; ordinarily they are not less than 30 feet apart.

One block of surfacing laid in 1919 shows the worst cracking of any so far laid. This pavement is so badly cracked that it will undoubtedly have to be replaced in a very short time; in fact, it should be replaced this season. The cracking was apparently caused by the pavement's being mixed with too small a percentage of asphalt. The resulting mixture was too brittle, and severe cracking was evident after the first cold weather in the fall after the pavement was laid.

One disadvantage in this method of constructing pavements is the high crown which very often obtains. This result is caused from the desire to use all of the old macadam possible in the center of the road, and the necessity of meeting the gutter already in place. As the macadam has usually been given a good crown for drainage, the addition of 3 inches of bituminous pavement will as a rule result in 1 or 2 inches of additional crown. This result would be more undesirable in a wet, cold climate than under the climatic conditions usual in Denver.

Acknowledgment is made to C. H. Draney, Superintendent of the Paving Division of the City and County of Denver, for his courtesy and assistance in supplying information and data relative to this work.

The Public Works of Modern Greece

By Walter E. Spear
Board of Water-Supply, New York City

WITH a staff of American and Greek engineers, the writer made, last year, an investigation for a complete system of water-supply and sewerage for the cities of Athens and Piræus. Compared with the eastern part of the United States, Greece is a very dry land. The entire annual rainfall is small; that during the summer is almost negligible, and all available water not required for the needs of men and animals is used for irrigation. The problem of developing an adequate supply of water for a population of 370,000 people now living in these communities, without prejudice to other interests, was not, therefore, a simple one, and all possible sources of supply within 100 miles of Athens were considered. These investigations took the writer over a large part of southern Greece and gave him an opportunity to see something of the existing public works and to learn from some acquaintance with public men the needs of modern Greece.

STORAGE RESERVOIR AT ATHENS AT END OF THE HADRIAN AQUEDUCT

Need for Modern Public Works

Modern Greece has a few handsome public buildings, some well-paved city streets, an insufficient mileage of indifferent highways, a few trolley roads and an inadequate railroad system, but really possesses no modern public works comparable with those of the progressive countries of modern Europe. During the last eight years, modern Greece has spent large sums of money on its army when it could have better been spent on water, sewerage and drainage works, more and better highways, additional railways and improvements of existing lines, and extensive port developments.

Water-Works

With an annual rainfall over large areas of southern Greece of less than 20 inches, most of which falls in the months of October to May, inclusive, and with a high percentage of run-off from rocky mountain slopes and semi-impervious soils, the amount of water available during the long, almost rainless summers is consequently small. Surface reservoirs for the storage of the winter rains have seldom been constructed, and the conditions are not generally favorable for such construction.

Outside of the larger cities, water is seldom piped to private dwellings; every householder carries his supply from the constantly flowing fountains, which are so conspicuous a feature of the Greek villages. The water from these fountains appears to be of a

ANOTHER STORAGE RESERVOIR AT ATHENS ON THE HADRIAN AQUEDUCT

satisfactory quality, except for the universal hardness. It is generally cool, though an agreeable temperature cannot be long maintained without ice during the heat of the summer, even by the use of porous jars. The amount of water actually used in these villages is naturally small, but none is lost, since the overflows of the fountains irrigate the village gardens and perhaps the fields outside. When the larger villages in Greece, which are now favored with sufficient water for their public fountains, install modern plumbing and begin to use as much water as other Mediterranean communities in France, Italy, or even in Egypt, it is going to be difficult to find water for their needs. Some villages, to which most of the water used is hauled several miles in barrels, may never be able to procure enough water to greatly raise their present standard of cleanliness. In some localities surface water might be developed, but the prejudice against its use for domestic consumption is very strong and cannot be readily overcome.

The largest problem in water-supply in Greece, and one that has been considered for some years by the Greek government, is that of providing an adequate supply of water for the cities of Athens and Piræus. These cities sometimes have during a dry summer but little more than ten gallons per capita, quite insufficient for their needs. Most of the Athens supply is furnished by the aqueduct and galleries, some 16 miles

AN OUTFALL SEWER NEAR DANIELS' CHURCH, ATHENS

A NARROW STREET IN THE OLDER QUARTER OF ATHENS

in length, that were built in the second century of this era, during the reign of the Emperors Hadrian and Antoninus Pius. The covered reservoirs at the end of the Hadrian aqueduct are seen in the illustrations. The Hadrian aqueduct was built as a tunnel through the limestones and conglomerates of the hillsides and valleys back of the city and is in some places 120 feet below the surface. The supply from this aqueduct is extremely hard, but otherwise satisfactory. Some additional water for Athens is provided by large open wells in the vicinity, and all of the inadequate supply delivered to Piræus comes from similar sources near that city, which provide a water much inferior in quality to the supply of Athens.

Most of the new sources of supply proposed for Athens during the past thirty years or more have been distant springs, the immediate development of which would represent a heavy burden upon the financial resources of the cities to be served. English, French and Austrian engineers have from time to time reported on the project of bringing to Athens and Piræus a supply of 20 million gallons or more of water from the springs near Lake Stymphalia, in the Peloponnesus, some 70 miles away in a straight line. The springs are at an elevation of about 2,000 feet and may be brought to Athens by gravity, but at the Isthmus of Corinth the necessary siphon at approximately sea level would be subjected to a

A WINDING ROAD OVER MT. CITHÆRON

very heavy pressure to deliver the water in Athens at the level required. Other sources that have been suggested are large springs in Bœotia, at the headwaters of the Melas River in the basin of Lake Copais. These springs have an elevation of only 300 to 400 feet above sea level and, though somewhat nearer Athens than those at Lake Stymphalia, would require pumping against a high head to get them over the Cithæron or Parnes Mountains, lying between Bœotia and the plains of Attica, in which Athens is located. The writer reported on still another source of supply somewhat farther away than either of the above, on the slopes of Mt. Parnassus, at an elevation of about 1,000 feet. These sources, which would supply fully as much water as those at Lake Stymphalia, may be brought to Athens in a gravity aqueduct that could be located over much more favorable ground than that from Lake Stymphalia, and a first development of surface water could be made along this aqueduct not far from Athens, at a favorable site for a large storage reservoir, which would serve to equalize the flow of the springs of the Parnassus sources. This development of surface water would represent a first step in the construction of the entire project.

Sewerage

Modern sewerage works can hardly be said to exist in Greece outside of Athens and in some of the other large cities, and there is little likelihood of any immediate construction of sewerage works except in Athens and Piræus. The general demand for modern sanitation does not appear to be sufficiently great to keep the cities and villages clean with their present facilities or to overcome in many localities the difficulty of finding sufficient water for modern sewerage works, or of securing enough money to build them.

Some traces of the sewers of ancient Athens have been found, but these sewers, dating back to the fifth century B. C., were probably built for storm-water drains and were not intended for the carriage of house sewage. Portions of modern Athens have storm-water drains which carry house sewage, though they were not intended for that use and are ill-designed for the purpose, having large and irregular sections and flat inverts. They are all built of rough rubble, plastered on the inside. A view of the outfall sewer of Athens, which carries the sewage to the channel of the Cephisus and to the irrigating ditches below it, is shown on page 24. Large areas in Athens are served by cesspools, and more primitive methods of disposal in open privies or pits are common in the poorer quarters. The need of Athens for a modern system of sewers is great, and proposals have been repeatedly made to provide such works. A few years ago a German engineer prepared plans for a combined system of sewers for Athens and Piræus. The writer, however, after consideration of the problem, adopted a separate system and prepared plans and estimates on that basis. This solution of the problem promised a more satisfactory method of disposing of the house sewage in a city surrounded by steep, rocky hillsides, from which the heavy winter rains would wash into a combined system of sewers so much detritus as to obstruct the summer flow of house sewage and create a nuisance.

The adoption of the separate system would permit the use of the existing sewers as a part of the storm-water drainage system, and would allow of safely discharging all storm water in Athens through comparatively short connections into the adjacent channels of the Ilissus and the Cephisus, and that in Piræus directly into the harbor. The difficulties of tearing up the narrow, tortuous streets of Athens and Piræus and of laying sewers and storm-water drains as well as water-mains there, may only be appreciated by those who have faced some such task elsewhere, and know besides something of local conditions in these Greek cities. The work would necessarily involve careful planning and thorough organization, not to speak of a large expenditure of money.

Roads

Between the small city states of classic Greece, communications were poor and there was no system of cart roads over the entire country. Back in the mountains the writer has seen some excellent examples of ancient highway construction, of well-cut, irregular, polygonal blocks which happen to have been preserved through accident of drainage. Most of these old roads have been eroded and washed away because sufficient drainage was not originally provided, a fault in road construction that is still observable in modern Greece, and, in-

deed, not unknown in our own country. Most of the existing highways are of comparatively modern construction, and it is not clear just why many of the mountain roads without gutters and adequate culverts do not entirely wash away during the winter. Certain it is that it is no pleasure to travel over them and, in the general absence of guard-rails on bridges and steep mountain sides, it is not very safe to do so. The much despised Turk appears to have done not a little road-building in his time and has left some very creditable bridges, a form of construction in which the Greek of to-day, as in the past, does not appear to excel.

AN OLD TURKISH BRIDGE NEAR MT. PARNASSUS

The large cities of Greece have some admirably paved streets, generally asphalt, but even in the cities and everywhere outside, with the exception of one short piece of road near Athens, the highways are surfaced with water-bound macadam, some of which is constantly being repaired and as quickly destroyed. Sometimes the destruction is the result of the torrential winter rains, but not infrequently it is done by heavy motor traffic, busses and trucks. I suppose that nowhere is the strain of eight years of war in Greece seen more clearly than in the neglect of the roads. Some important highways of macadam construction are now quite impassable, even with a Ford. In the vicinity of Athens there has been recently a large increase in the use of heavy motor busses to the surrounding towns, and that, with the automobiles and motor trucks, all driven at a pace that alarms the visitor, is destroying the roads more rapidly than they can be repaired. A road built of soft limestone rock, with a filler of sand and dust of the same material, cannot be expected to stand up long in the dry summer when it sometimes does not rain for weeks at a time.

Some new road construction was being carried on by the government last fall through a contract with an English firm, one road near Athens, another back in the mountains. Both were being surfaced with water-bound macadam. No doubt, if the hopes of the Greeks are realized and oil is discovered in Greece, some improvement in the character of construction may be looked for.

ACKNOWLEDGMENT.—From an address by the author printed in the *Journal* of the Boston Society of Civil Engineers, June, 1921.

The Prevention of Disease

There is a vast amount of confusion in the public mind as to ordinary cleanliness in public health. Many cities are esthetically planting nasturtiums where the ash-pile stood and are permitting typhoid fever and diphtheria carriers to roam at large.

While health itself cannot be bought, money and efficient organization can buy prevention from disease and infection, which in the end is the same as purchasing health.

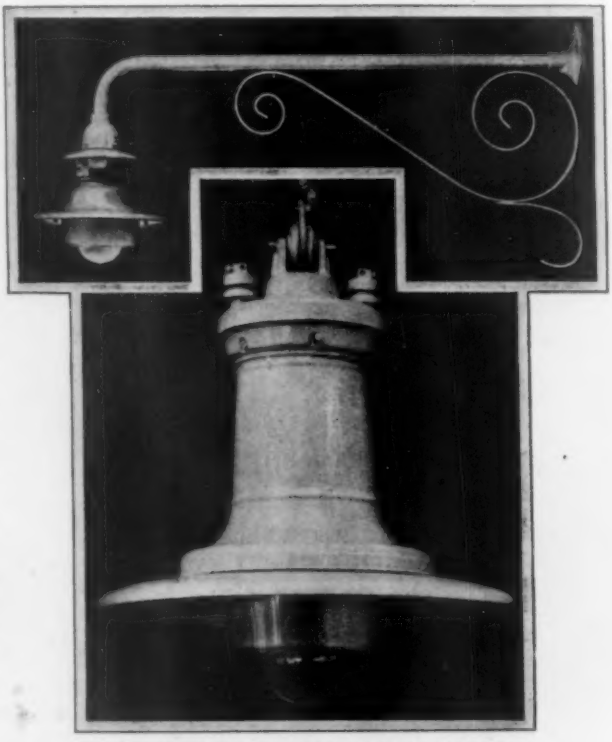
Public Health, State Department of Health, Lansing, Mich.

From Natural Gas to Electric Street Lighting

Borough of Kane, Pa., Makes Contract with Local Company for Electric Street Lighting Service

By O. S. Scott
Chairman, Lighting Committee, Borough of Kane, Pa.

IT has been the custom in many Pennsylvania cities located in the natural gas belt to use for street lighting this almost free source of illuminating material. In the old days in Pittsburgh open-end tubes were left flaming day and night, as it was cheaper to let them burn than to hire the necessary labor to shut off the gas at daybreak and to light them at night. In many cities to-day it is the custom to leave the Welsbach mantles burning all the time and have a man go around and turn the gas on full at night and turn it down in the morning. Lighting with natural gas is now becoming a considerable item of expense owing to the scarcity of gas and its gradual increase in price. It is only a question of time when street lighting by natural gas, in Pennsylvania particularly, will be a thing of the past.



TYPES OF PENDANT ELECTRIC STREET LIGHTING FIXTURES IN KANE, PA.

In order to provide itself with adequate and modern street lighting, the borough of Kane has drawn up an ordinance and made a contract with the electric service corporation. The contract and ordinance call for the service for a period of ten years at a rate of $28 per year for each 100-candle-power light, $43 per year for each 250-candle-power light, and $55 per year for each 400-candle-power light. The company under this agreement has furnished and installed and will maintain all lights, standards, poles and wire, as well as furnishing the electricity.

The illustrations herewith show the two types of fixtures in use. The 150- and 200-candle-power lights are of the bracket type with band refractors, and the 400- and 600-candle-power incandescent lights are of the Novalux pendent type with band refractor and reflector.

In this manner another Pennsylvania borough has stepped forward into the ever-increasing group of well-lighted cities.

How Polk County Pulled Out of the Sand

An Interesting Method for Building Sand-Clay Roads, and a Lesson in Road Widths

By H. S. Jaudon

PRIOR to 1915, Polk County, Fla., was almost isolated because of the poor condition of its sand roads. In that year the Board of County Commissioners decided to make some experiments to see if a type of road could be built at a reasonable cost to connect the county with contiguous territory. The only logical way by which they could provide the funds was by a bond issue, and the only way they felt that it would be possible to carry a bond issue would be to build a system of roads to connect every town in the county with every other town. They were therefore confronted with the problem of building almost 217 miles of road in order to get a proposition before the people which would appeal to them and bring out the favorable vote. The largest bond issue which it was felt could be placed before the people was between one million and one and one-half million dollars. Brick roads, which were extensively used in Florida at that time, would cost about $3,500,000, so that some other type of road had to be developed.

In the city of Bartow, Fla., in 1912, an asphaltic concrete pavement was laid on what is known locally as a Bartow clay base. This is a clay found in the vicinity that has the property of setting up when water is applied and making a reasonably hard surface. This type of construction had given good service, and no money had been spent on it for maintenance.

"BEFORE AND AFTER" SCENES ON POLK COUNTY ROADS, FLORIDA

The Commissioners employed the H. S. Jaudon Engineering Company of Elberton, Ga., which had laid the Bartow pavement, to lay five demonstration stretches of this pavement in different parts of the county. These demonstration stretches were laid in 1915 and are still in use. From the results obtained in Bartow and by observing the demonstration sections, the County Commissioners felt that this type of road would be

satisfactory and submitted a bond issue for one and one-half million dollars to the voters in 1916. This was the largest amount that had ever been asked in a bond issue in the South for road building, but it was carried by a large majority. The construction work was divided into five contracts for the road work and one for the bridges. Work began in the fall of 1916, and the entire system was finished in the fall of 1918.

Type of Construction

The roads were laid as sheet asphalt pavements with clay base, the clay being the most available found alongside or near the roads that were being constructed. In the middle and southwestern part of the county, Bartow clay or a low-grade soft phosphate rock was used and an excellent base obtained. In the northern and eastern parts of the county a sand-clay mixture was used, as the extra freight for shipping Bartow clay to these points would have added some $200,000 to the bond issue. The widths of the roads were fixed by the County Commissioners and governed by conditions of traffic and the money available. The system covered 217 miles, and of this about 100 miles was 15 feet wide and the remainder 9 feet wide. Already there is an effort being made to secure funds to widen the 9-foot roads. The cost of maintenance on the 15-foot road has been very small, while the maintenance on the 9-foot road has been a little higher. In fact, 90 per cent of the money that has been spent in maintenance has been spent on the 9-foot-wide roads. The system has demonstrated that while a 9-foot road is better than sand to travel on, from the commercial and investment standpoint it is a mistake to build a road of this width. The system has also demonstrated that it is possible to build this type of road and obtain good results, but that proper drainage is very essential in the construction. Almost every one of the few cases in which failure has occurred can be traced to the road-bed's not being high enough out of the water, or to the drainage system's having been allowed to get into a condition so that it was not functioning properly.

The asphalt surface was laid as near a true sheet asphalt as possible with the products which could be obtained in Florida The effort was made as far as possible to buy nothing outside the state except the asphalt and the cement. Coarse sand was obtained from a pit developed in the northern part of the county near Davenport and from Lake Weir, and the fine sand from near the plants. The filler was obtained by grinding Florida limestone, which is practically an entirely new industry.

The cost of these roads to the county complete was about $1.30 per square yard. This means the completed roads, including the asphalt top, the base, the grading and the engineering supervision. The completed 15-foot roads cost between $9,500 and $10,000 per mile. The immediate result of the improved road system was that property values throughout the county very nearly trebled, and because of the increase in the value of property the tax rate has been increased only about two mills.

One in Ten Physicians Will Write It "January, 1921"

At least ten per cent of the physicians in the various states during January, 1922, will continue to date birth certificates, January, 1921, unless they make special resolutions not to, according to vital statisticians of the various state health departments, basing their estimates on mistakes made in other years. Such incorrect dating of birth certificates, they point out, is an infraction of the law. It adds a year to the age of the child, it may make the child appear to be born out of wedlock, or it may permit parents to force the child to leave school a year too early, to get working papers illegally, and may make boys liable to military service before their time. An incorrect birth certificate may prove a source of entangling inconvenience to the child throughout life.

Whenever a certificate is found that is obviously dated incorrectly, attempts are made to correct it. This requires considerable clerical help, as affidavits must be secured, and is an expense to the individual and to the taxpayers of the state. Explaining the psychology of the physicians' January mistake, one of the workers defined memory as "the mental revival of conscious experience," adding that "automatic action such as writing and speaking may at first be conscious and ultimately become subconscious yet form the basis of special memories."

Forward Steps in Municipal Affairs

City Planning Commissions

The Moral Force of a City Plan

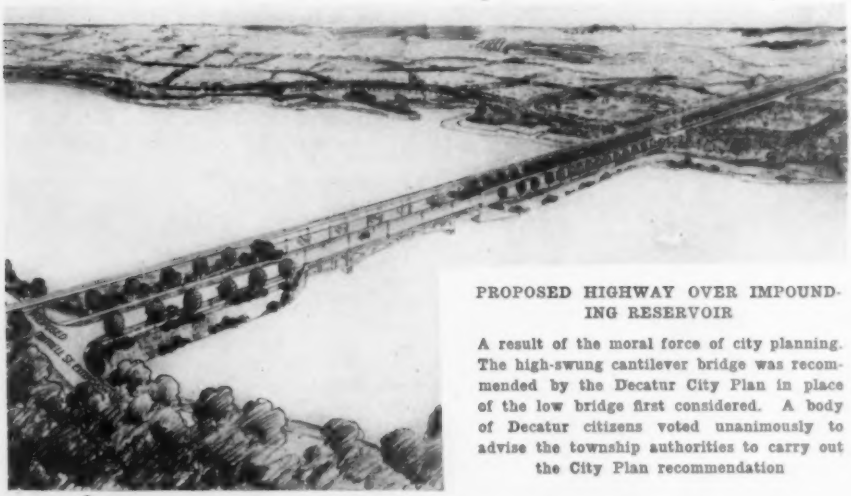
DECATUR, ILL.—Not a few communities have city plans that are dead. Carefully prepared by some recognized planner, paid for by voluntary contributions, and adopted by civic gatherings with enthusiasm, they have been forgotten, and lie neglected and dust-covered, while the city continues to develop without order or design.

The real problem with a voluntary city planning board that is not clothed with legal powers to enforce the plan, is to make the plan a living, breathing thing which will really accomplish results.

The Planning Commission of Decatur, Ill., which is a large committee of the Association of Commerce, believes that if a plan is kept before the people through newspaper publicity, talks to clubs and schools, and conferences with the city council, it should have a marked effect upon community development even if there exist no means of enforcing it.

Public sentiment can accomplish remarkable results. A community that is "sold" on its plan is not inclined to be tolerant with those who disregard it. The fact is that a plan which is kept alive is a moral force in the direction of orderly development.

Decatur is now completing an impounding basin 13 miles in length, which will give it an ample water-supply and provide recreational facilities at the city's door. A recommendation in the Plan was that a new bridge crossing the lake should be placed at a high elevation near a railroad trestle instead of being placed where an old low-level bridge had been serving. Opposition to the high structure had been expected from some interested property owners, but at the hearing on the site of the bridge, attended by business men, small neighborhood storekeepers, and workmen in the factories, the expressed opinion was unanimous that the Plan recommendations should be carried out. It was a great victory for foresight



PROPOSED HIGHWAY OVER IMPOUNDING RESERVOIR

A result of the moral force of city planning. The high-swung cantilever bridge was recommended by the Decatur City Plan in place of the low bridge first considered. A body of Decatur citizens voted unanimously to advise the township authorities to carry out the City Plan recommendation

and vision, and it will give the city a beautiful and dignified gateway instead of a mere river crossing.

The Plat Committee of the Board of Supervisors came before the Commission and voluntarily announced that it would not recommend for record any plat that did not correspond with the Plan.

Frequent inquiries are made of the Commission as to what the Plan provides as to the location of industries. The real estate dealers have been invited into the Commission's conferences, and are now particularly interested in zoning, a scheme never thought of until the Plan was inaugurated.

The Plan Commission has gone on record as favoring the appointment by the Mayor of a legal body to take over its functions under the law recently enacted providing for city plan boards, but it has been advised by Myron H. West, city planner, that the Commission as a voluntary committee should continue its work of education and advice in order that the Plan may be constantly before the community, as a moral force.

W. F. HARDY,
Chairman, City Planning Commission.

An account of the Decatur Plan appeared in the October, 1920, issue of The American City, page 383.

City Managers

How a Texas City is Relieving Unemployment

Houston, Texas.—This city is striving to meet its unemployment problem in a practical way. Every unemployed man who proves himself not to be a professional floater is hired by the city as a park employee.

While it is realized that the wage of $1.25 a day is extremely small, it is enough to keep body and soul together until something better is available. The city has suggested to large employers of labor that they give the men at work in the parks the preference when in need of additional help, and those doing the best work for the city at the nominal wage are given the first opportunity to take advantage of the better-paying jobs when offered. Several of the larger oil companies have thus had the opportunity to secure the services of men who have been tested as willing workers.

Since the city inaugurated this employment scheme, an average of 250 men have reported each day at Herman Park, where most of the work is being done. For 10 cents the men are given a large mug of coffee and two generous sandwiches. The wage is paid each day so that the men will have cash to take care of dire necessities.

C. E. BELK,
Manager.

Health Departments

An Effective Step to Keep Down Epidemics

Kenilworth, Ill.—The following notice has beent sent to all householders. It is designed to force physicians to report all diseases instead of neglecting to do so at the request of the patient or his family:

"In order to centralize records, the Village Board has recently appointed the Village Manager as Health Officer and Captain Murray as Deputy Health Officer for Kenilworth. These men serve in this capacity without additional compensation.

"In addition to the notification required of the attending physician, you are required to notify the Health Officer or, in his absence, the Deputy Health Officer, of any case of a reportable disease of which you have knowledge either inside or outside of your family, as required by the Illinois Department of Public Health.

"In order to preserve and improve the public health, it is required that every case or suspected case of any of these diseases must be reported to the local health authority within twelve hours, by the attendant, householder, or any other person having knowledge of such known or suspected case. A report made by telephone must be followed within twelve hours by a written report.

"Local health authorities must transmit copies of all such reports to the State Department of Public Health, Springfield, within twelve hours after receipt of same.

"Health officers who fail, neglect or refuse to enforce the rules for the control of communicable diseases, and all persons who violate these rules, subject themselves to a fine of up to $200 for each offense, or imprisonment in the county jail not to exceed six months, or both.

(Signed) DIRECTOR, ILLINOIS DEPARTMENT OF PUBLIC HEALTH."

A complete list of reportable diseases accompanies this notice.

F. L. STREED,
Village Manager.

Fire Departments

Fire Alarm Boxes in Schools, Hospitals, etc., Made Mandatory

COLUMBIA, S. C.—Following the passage of an ordinance in Columbia requiring all public schools, hotels, hospitals, moving-picture houses and theaters to install fire alarm boxes, such boxes were installed at once. The ordinance was prepared by the writer and F. D. Marshall, Council Superintendent of the Electrical Department.

For the installation an oval shell type of Gamewell fire alarm box was used, and all wires were run in rigid conduits. The city feels that a distinct step in public safety has been taken through the passage of the ordinance and the immediate installation of the boxes.

The ordinance reads as follows:

An Ordinance to Amend an Ordinance Entitled "An Ordinance Requiring All Public Schools, Hotels, Hospitals, Moving-Picture Houses and Theaters to Install Fire Alarm Boxes"

Be it ordained by the Mayor and Council of the city of Columbia in council assembled:

That an ordinance requiring all public schools, hotels, hospitals, moving-picture houses and theaters to install fire alarm boxes be amended, and the same is hereby amended by adding the following proviso:

"That in case any person, firm or corporation shall hereafter operate or conduct any said public school, hotel, hospital, moving-picture house or theater without installing said fire alarm boxes, as herein stated, within thirty days after notice in writing to do so having been given by the representative of the city, he, she, or it shall be fined, upon conviction before the Recorder, a sum not exceeding one hundred dollars, or imprisoned for a period not exceeding thirty days, and each and every day after the expiration of the said thirty days that the terms of this ordinance are not complied with shall be deemed and considered a separate offence." That the said ordinance when so amended shall read as follows:

That all public schools, hotels, hospitals, moving-picture houses and theaters are hereby required to install at their own expense standard Gamewell fire alarm boxes at such place, or places, as shall be designated by City Council, or their representative, the city to maintain same after installation. That boarding-houses with more than twenty-five rooms will be classed as hotels.

That in case any person, firm or corporation shall hereafter operate or conduct any said public school, hotel, hospital, moving-picture house or theater without installing said fire alarm boxes, as herein stated, within thirty days after notice in writing to do so having been given by the representative of the city, he, she, or it shall be fined, upon conviction before the Recorder, a sum not exceeding one hundred dollars, or imprisoned for a period not exceeding thirty days, and each and every day after the expiration of the said thirty days that the terms of this ordinance are not complied with shall be deemed and considered a separate offence.

W. H. HARTH,
City Electrician.

A "HOME-MADE" TRAFFIC STANDARD THAT WILL GIVE LONG SERVICE

Highway Departments

A Simple and Effective Traffic Standard

LA GRANDE, ORE.—The picture above shows a traffic standard of simple construction which is giving complete satisfaction in this city.

The base is of reinforced concrete, 2 feet in diameter and 1 foot in height, of which 5 inches are vertical, and the remainder rounded. The disks are 9 inches in diameter, cut in two, and placed at right angles in a piece of pipe 1¼ inches in diameter and 30 inches long. Six inches of the pipe are embedded in the concrete base. Eleven of these traffic standards have been made at a total unit cost of about $9.86.

Their durability has been tested for several months, during which a number of machines have collided with them. These accidents have resulted in very little damage to the standards, but it has been remarked that no machine has yet hit a standard a second time.

GEORGE GARRETT,
City Manager.

Recreation Departments

A Bath-House That Serves the People

OMAHA, NEBR.—Located between Cass and Chicago Streets and between 15th and 16th Streets, in Omaha, lies Jefferson Square, containing 1.72 acres. This park, although one of the smallest in the system, is patronized daily by thousands of people, principally those living in the most congested section of the city, and many who have no home whatever. It is known as "No Man's Home."

In the center of this park stands the Jefferson Square public bath-house and comfort station for men and boys. As few women patronize this park, and as this is the first public bath-house in Omaha, a women's department was not built.

The outside walls are built from old cobblestones that were torn up from the streets. The inside walls are cement, and there are cement partitions and floors.

The caretaker's office contains two large automatic gas heaters, cupboards for supplies, brooms, etc. Across from this is the comfort station, with toilets, wash-bowls, etc. In the middle of the building is the men's locker room, equipped with about forty lockers, and back of this is the men's shower-bath room containing ten shower-baths. This is a large room, well equipped and lighted, with the showers in the middle. Steel partitions are used to separate the showers, but there are no doors. A separate locker room and shower room with four "gang" showers is reserved for boys. Before this building was built, a survey of the district was made. It was found that a large number of the men living in the district worked in the smelters and railroad shops and that there were very few bath-tubs in the district. Besides this, most of the "floating population" made this square their headquarters. The bath-house is usually kept open from June 1 to October 1, and as a rule is self-supporting. This year, owing to large repair bills on our heaters, we lost about $200. The bath itself is free. A bath towel and soap are sold for ten cents; also a key to a locker. The key and towel must be returned to the caretaker after the bath. Boys are charged but five cents. Following is the final report submitted to the City Council, which speaks for itself:

JEFFERSON SQUARE BATH-HOUSE
Number of Bathers, Receipts and Disbursements
For Year 1921

Total number of bathers with own towels.....		3,101
Total number of towels issued at 10c for men..		9,572
Total number of towels issued at 5c for boys..		578
Total number of bathers for the season.....		13,251
RECEIPTS		
From towels issued.....	$986.10	
From Recreation Fund.....	235.43	
		$1,221.53
EXPENDITURES		
For disinfectant	$35.90	
For toilet supplies	32.31	
For repairs to heater.....	72.60	
For repairs to roof.....	39.50	
For laundry	303.01	
For gas	276.38	
For soap	75.00	
For caretaker	386.83	
		$1,221.53

IRA B. JONES,
Director of Recreation.

THE BUSINESS SECTION OF CEDAR RAPIDS.

The large bridge on the left has recently been opened for traffic. It is 600 feet long and to the city, which plans to erect on it a city hall and county court house, making it a real

Public Welfare Departments

How Toledo's Emergency Relief Program Has Worked

TOLEDO, OHIO.—With but ten weeks of experience to look back upon, it is perhaps too early to reach any very accurate conclusions concerning the success of the various features of Toledo's program. There are, however, several aspects of that experience which are significant.

It will be remembered from the brief article in the December AMERICAN CITY, that the Mayor's Committee on Unemployment, as organized along lines suggested by the National Conference, consisted of committtees on employment bureaus, relief, public work, private work and recreation. It was hoped that these committees would at least provide a means for coordinating the efforts of the city's numerous agencies.

Cooperation of the city's fire-fighters was secured and provision was made for registration of all unemployed at the various engine-houses of the city, with a central clearing-house in the office of the Welfare Director, from which all placements were to be made. Information as to the applicant's needs was secured and to some extent verified by the firemen. When men were needed, cards were pulled from the down-town office, the engine-house where the men had registered was notified, and firemen got in touch with them. Men were required to register from the engine-houses nearest their homes.

Some 3,000 men have registered in this way. By far the greatest share of those registered have been unskilled laborers, only some 300 having a skilled trade. It developed that the skilled workers would not register through the engine-houses, preferring to apply at the regular employment agencies, or trust to their union officials.

The disappointing fact was that very few opportunities for private work were developed. The committee on private work, given the task of finding such jobs, met only a few times and decided there was nothing to be done. A special bond issue of $490,000 passed by Council for work on parks and boulevards, providing funds for the employment of about 800 men in addition to the regular force. All these men were taken from the list filed with the placement bureau; and since they were hired for shifts of two weeks, it has been possible to give some work to all the unskilled workers registered.

The work that has been done by these men was specially chosen so as to require the least possible amount of material and supplies, so that most of the money has been used for the employment of labor. A new roadway was built leading into an East Side park, and a road already there was raised up from the lowland so as to be high and dry throughout the year. A golf course was constructed in Bayview Park, a perfectly flat piece of land with no trees upon it, and the construction of bunkers, the laying out of a new roadway, and the planting of trees have improved materially the appearance of the park. Underbrush was cleared away from considerable tracts of wooded land recently acquired for park purposes and as yet unimproved. Swampy

IOWA, SHOWING ITS SEVEN BRIDGES
90 feet wide. Its center abutment will form the north end of the island. This island belongs municipal center

portions of the same parks were filled up or drained. A new section of the boulevard is being constructed.

Other public work has been pushed by the County Government and the Board of Education. The county is starting work on a big sewer project which was not to have been begun until spring. New school buildings projected by the Board of Education are being hastened.

Next to public work, the phase of the program which has met greatest success has been that of poor relief. Through the committee on poor relief it was possible to adopt certain uniform principles and to get them followed by the various agencies of the city which had hysterically begun innumerable projects for relieving the needy. The clearing-house established by the Social Service Federation is being used to a greater extent than ever before. Lodges, churches, neighborhood organizations and business men's clubs have been won over to the importance of clearing through this central office. Forms of relief which cannot be furnished by the city or the Social Service Federation are being provided by these clubs with a minimum of duplication. All over the city women are meeting to repair old clothing, which is then distributed to the poor. At this holiday season all Christmas giving to the poor is being done through a special central clearing-house.

The only remaining phase of the program to be discussed is that of the recreation committee. This committee, headed by Professor Charles Bushnell of Toledo University, has prepared elaborate plans for community entertainments this winter in school buildings and community centers. The Central Council of Civic Agencies has taken up the plan and will assist in carrying it out. The idea is to provide free recreation of all kinds for those who will this winter have more leisure than ever before, while less able to buy entertainment. The plan promises much, but has not begun to work.

WENDELL F. JOHNSON,
Secretary, Commission of Publicity and Efficiency.

The Roads of Houghton, Michigan

GREAT pride is taken by Houghton County, Mich., in its roads. The illustration below shows one of the county roads, known as Frog Pool Hill. This road was built by the penetration method in 1918, using Stanolind Paving Asphalt C. A recent inspection of this road showed that it was in almost perfect condition, and inquiry brought out the fact that no repairs had been made during the three years the road has been undergoing almost continuous traffic. This and most of the work on the roads in and about Houghton have been done under the supervision of the County Engineer's Department, T. A. Coon, County Engineer.

FROG HILL ROAD, HOUGHTON, MICHIGAN

Detroit's Bureau of Public Safety Gets Results

By Arch Mandel
Detroit Bureau of Governmental Research, Inc.

THE purpose of all traffic regulations, particularly in cities, is to expedite the movement of vehicles through the streets with as few accidents as possible; in other words, it is a safety measure. Traffic officers and mechanical devices of various kinds are all desirable and necessary, but if the toll of injuries and fatalities due to street accidents remains constant or is increased, traffic regulations have not served their full purpose.

In order that the aim of traffic regulation and control might not be lost sight of, Detroit created, by charter, a Bureau of Public Safety within the Police Department and provided that one deputy commissioner should have charge of this Bureau.

The charter provision follows:

Bureau of Public Safety:
The deputy commissioner of police in charge of public safety shall have supervision of the enforcement of all traffic ordinances and regulations affecting streets, avenues, boulevards and other public places, shall keep a record in his office relative to accidents occurring therein, incident to traffic, shall investigate the causes thereof, shall make recommendations to the commissioner of police, which shall be transmitted to the common council for necessary legislation to prevent and suppress such accidents, and shall, through educational publicity among the people of the city, seek to reduce the number of such accidents.

The Bureau conducts an all-year-round campaign through speeches before all kinds of groups, or by the exhibition of "safety" moving pictures before schools, churches and other organizations, and by continuous newspaper publicity of traffic accident statistics, etc. In addition to this, an intensive safety campaign, usually a week in duration, is held semi-annually.

In the sixth semi-annual campaign held last June, over 25,000 persons, including school teachers, women's clubs, Boy Scouts, Camp Fire Girls, Detroit Automobile Club, clergy, Fire Department, etc., took an active part. Seven hundred open-air meetings were held; 8,700 talks were given; a daily parade including 25 wrecked automobiles was part of the program, and one million pieces of publicity were distributed, in addition to hundreds of large appropriate signs displayed in prominent points throughout the city.

One of the most important branches of the Bureau of Public Safety, a feature in accident reduction methods unique to Detroit, is the Accident Investigation Division. This consists of twenty officers under the direction of two detective lieutenants, who investigate thoroughly every traffic accident, following the same careful procedure pursued in the investigation of criminal complaints.

The old practice was to take into court only those persons involved in accidents that were witnessed by the police, except in instances where the victim was killed. The result was that 95 per cent of street traffic accidents were settled out of court, chiefly by accident insurance companies. The cases that were investigated were assigned to officers already sufficiently occupied with work on criminal complaints.

"HITCHING" BY CHILDREN IS THE CAUSE OF MANY ACCIDENTS. SAFETY INSTRUCTION CAN REDUCE CASUALTIES FROM THIS PRACTICE

DISPLAYED ON A PROMINENT CORNER AND KEPT UP TO DATE, THIS SIGN KEEPS THE PEOPLE OF DETROIT INFORMED OF THE PROGRESS OF THE CAMPAIGN

Up to December 15, 1921, the Accident Investigation Division was responsible for the conviction in court of 931 persons, most of whom, under the former policy, would merely have referred their difficulties to the insurance companies. It needs no diagram to prove that immunity from punishment for the destruction of life and limb on the streets not only does not encourage care on the part of drivers, but tends to become an invitation for reckless driving.

Are the methods pursued by the Bureau of Public Safety making Detroit streets more safe? Up to December 15, 1920, Detroit had 239 street traffic deaths; for the same period of this year, street traffic fatalities were cut almost in two, reducing deaths from this cause to 131.

Attractive Publicity for the Public Utilities of a City

One of the displays attracting a maximum of attention from the 300,000 visitors at the Industrial and Trade exposition held recently in Los Angeles, Calif., under the auspices of the Chamber of Commerce, was installed by the City Bureau of Power and Light. It visualized the watershed of the Southern California metropolis, showing the city power-plants and the great aqueduct utilized in generating power. Figures were given of the costs, the power supplied and the returns to the city

The Economic Side of Anti-Siphon Traps in Plumbing Systems

By A. E. Hansen
Hydraulic and Sanitary Engineer, New York

CONSIDERABLE attention has been centered of late on the possibilities of reducing the cost of plumbing installations, and the theory has been frequently advanced that the use of anti-siphon traps would obviate the back venting now required by plumbing codes whenever ½ S or bent tube traps are installed, and that a material saving in cost of plumbing work would result.

It is not the purpose of this article to dwell in any way on the scientific principles which underlie the merits or defects of unvented anti-siphon traps, nor to compare their efficiency or usefulness from a technical view-point with that of the vented bent tube traps, but it is the purpose to limit it entirely to the economic side of the question.

Perhaps the most recent typical example of a statement made publicly concerning the economy resulting from the use of anti-siphon traps, occurred during May, 1921, when testimony was given by a builder before Samuel Untermyer, Chief Counsel for the Lockwood New York State Housing Investigating Committee, to the effect that the installation of approved anti-siphon traps in a certain New York City building project would have reduced the cost of the plumbing installation about 50 per cent below that of the vented ½ S trap system.

That the witness was thoroughly misinformed on the subject of his testimony will be clear to any one who reflects on the fact that the cost of the plumbing fixtures—that is, the water-closets, urinals, slop-sinks, wash-basins, bathtubs, kitchen sinks, and wash-tubs, of the hot and cold water-supply pipes and fittings, and of the soil and waste pipe systems remains the same whether anti-siphon traps or ½ S traps with vents are used. The total cost of these items is from 90 to 98 per cent of the cost of the entire plumbing job. Furthermore, under the New York City Plumbing Code requirements, all water-closets must be back vented, there being no approved deep seal fixtures of this kind on the market. A separate vent stack would have to be installed, and therefore the only actual saving by the use of anti-siphon traps would be the short vent branches from the fixtures (other than water-closets) to the vent stack.

In order to satisfy myself on the real economy, if any, of anti-siphon traps as compared with ½ S vented traps, I prepared a plumbing diagram of a typical three-story apartment house, reproduced herewith, which shows in full lines the soil, waste, and vent pipes required by the New York City Plumbing Code, if the approved anti-siphon trap is installed for all the fixtures (exclusive of the water-closets). In dotted lines are shown the additional vent pipes required if the ½ S vented traps are used. I submitted this diagram to three responsible New York master plumbers, with the request that they estimate the costs of the ½ S traps and their vent branches as shown in dotted lines, and also of the anti-siphon traps without vents, as permissible under the New York City Code. I asked them further to consult with each other, and to present to me, if possible, joint estimates which they would consider fair. These estimates were as follows:

UNVENTED PATENTED TRAPS

Patented		
6—1½-inch traps at $ 7.00	$42.00	
3—2- inch traps at 11.00	33.00	
Total cost	75.00	
plus 10 per cent profit.	7.50	$82.50

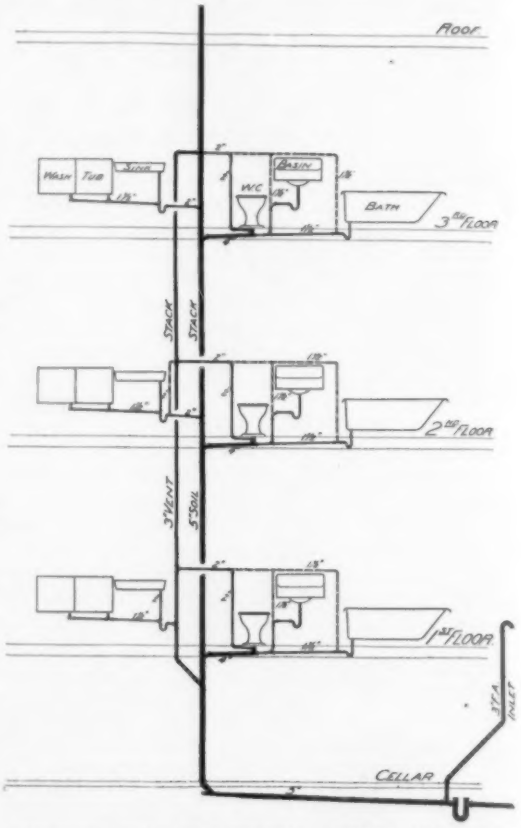
VENTED ½ S TRAPS

24 feet—1½-inch galv. pipe at $.18	$ 4.32	
9—1½-inch galv. mall. fittings at $.30	2.70	
6—1½-inch brass ½ S traps at $1.30	7.80	
3—2-inch brass ½ S traps at $2.50	7.50	
1 day labor.....	10.00	
Total cost	$32.32	
plus 10 per cent profit	3.23	$35.55
Excess cost of unvented patented traps over vented ½ S traps		$46.95

The estimates, it will be observed, show that the actual cost of the vented ½ S traps to the owner, including a 10 per cent plumbers' profit, which I asked to have included, is about $50 less than that of the unvented traps. I believe that the estimates are in-

tended to be proper and are deserving of confidence. Assuming, however, that the labor item of the vented ½ S traps had been 200 per cent underestimated, there would still remain a balance of $25 in favor of the vented ½ S traps.

An analysis of the estimates of cost made by the plumbing contractors indicates that the materials required are correctly inventoried and priced, and that the labor to be performed consists of measuring and cutting 14 pieces of 1½-inch galvanized iron pipe to lengths not exceeding 3 feet; of cutting 28 1½-inch pipe threads, and of installing 14 pieces of 1½-inch pipe and nine 1½-inch fittings. The measuring and cutting should reasonably consume not over ¼-hour each, or 3½ hours total; the cutting of 28 threads not over 1/7-hour each, or 4 hours total; the installation of 14 pieces and 9 fittings not over ⅓-hour each, or 8 hours total. My own estimate of the total labor required would therefore be 15½ hours, or, say, 2 days, instead of 1 day, or $20 instead of $10; but even under this condition the ½ S vented traps are about $36 cheaper than the unvented anti-siphon traps.



PLUMBING PLAN FOR TYPICAL 3-STORY APARTMENT HOUSE

If the number of floors were increased, or the number of apartments per floor multiplied, each requiring a similar typical plumbing installation, this difference would, of course, become correspondingly greater. It is evident that the greater cost of the unvented anti-siphon traps is largely due to the high cost of the traps themselves. Seven dollars for a 1½-inch and $11 dollars for a 2½-inch trap are big prices, which seem unwarranted except on the ground of patent or other fees.

From the representative example given, it is fair to conclude that the much-voiced opinion on the invariably lesser cost of unvented anti-siphon traps is not based on actual facts; there are, no doubt, certain individual cases, especially in alteration work or in small dwellings, in which this opinion will be found to be true, but the evidence shows, particularly where the plumbing is condensed near the vertical stacks and where toilet or bathrooms are located repeatedly alike and directly over each other, as is usually the case in apartment buildings, hotels, and office buildings, that the ½ S vented traps are as cheap and perhaps cheaper than unvented expensive anti-siphon traps. It must be borne in mind in this connection also, that patented articles are unlimited in price and not subject to competition, especially where, as at present in New York City, only one such article is approved for use.

The chief item of cost in a back venting system is involved in the venting of water-closets, which are not made with anti-siphon traps; these must be back vented in any case, according to most of the plumbing codes.

The only additional vent pipes required, therefore, for the other plumbing fixtures consist of the short 1½-inch and 2-inch branches which connect the individual traps to the main vent stack or to the water-closet vent branch.

The Conference on the Standardization and the Elimination of Excess Variety of Vitrified Paving Brick

FIFTY-FIVE sizes and varieties of vitrified paving brick were eliminated by mutual consent at a meeting called in Washington in November by Secretary Hoover of the Department of Commerce. This conference of users and makers of paving brick was held at the suggestion of the National Paving Brick Manufacturers Association, which met with representatives of the Department of Commerce and with representatives of the U. S. Chamber of Commerce in a preliminary conference to determine the areas of standardization possible in this particular industry. As a result of this preliminary meeting, the manufacturers, under the general direction of the Department of Commerce, instituted a variety survey of the vitrified paving brick industry, which formed the basis for the meeting. A permanent committee to be known as the Committee on Simplification of Variety and Standards for Vitrified Paving Brick of the Department of Commerce, was created for the purpose of making other eliminations as time goes on that will be mutually acceptable to producer and consumer.

In addressing the Conference, Secretary Hoover said:

"The proposal that you are considering is no new idea in American industry, but it comes up in its best form on this occasion because it is inspired by the manufacturers themselves.

"One of the problems of the paving brick industry is the wide diversity of style in the demands made upon the manufacturers by engineers, that have increased their cost of production unnecessarily. This problem was brought to the Department of Commerce by the manufacturers themselves. We were asked if we could act as a center point to bring about some agreement in matters in general by which these varieties could be simplified and the cost of production materially decreased. Obviously, the consumer is the engineer, as he makes the specifications and directs the purchase. The manufacturers are helpless to come to any conclusion of this kind unless they can have the coöperation of the engineers who make the specifications and finally pass upon these matters.

"We have had some discussion with the manufacturers on this problem and they themselves have made through their engineers a very careful study of this whole problem. The primary object of this meeting is to see how far an agreement can be reached for the simplification of varieties and how far the consumer will coöperate with the manufacturer in securing these varieties. There is little I can add, though I realize the importance of it. This is but one item which I hope will be extended in a general campaign among manufacturers in all directions. We have more problems of this kind and meetings going on with the help of the Chamber of Commerce in many industries. I believe it is the only practical way in which we can develop these essential groups in industry—that is, by the manufacturers' voluntary action, and if you gentlemen can come to some definite conclusion we shall be glad to give it such prestige as the Department can give. Obviously, if the engineers who direct the work in our cities, and the manufacturers will cooperate in reaching such a conclusion under the agency of the Department of Commerce, there can be no criticism of anybody engaged in this work, and if we can secure that coöperation we shall secure at the same time progress in the industry itself. I look upon this meeting with more than usual interest because it is the first of those processes that we have brought to this state."

After a thorough discussion of the report of the National Paving Brick Manufacturers Association, which contained an exhibit of the tabulation of actual shipments of paving brick of 66 varieties from 1914 to August 1, 1921, motions were made, seconded and unanimously passed by the Conference, reducing the varieties for consideration from 66 to 20. For the basis of discussion, a maximum size of brick, 4 inches in depth by 3½ inches wide and 8½ inches long, and a minimum of 3 inches deep, 3 inches wide and 8½ inches long are used. The following table gives the dimensions and types of the 20 varieties of brick decided upon:

Depth	Width	Length
Plain Wire-cut Brick (Vert. Fib. Lugless)		
Inches	Inches	Inches
3	4	8½
3½	4	8½
Repressed Lug Brick		
Inches	Inches	Inches
4	3	8½
3	3½	8½
3½	3½	8½
4	3½	8½
Vertical Fibre Lug Brick		
Inches	Inches	Inches
3	4	8½
3½	4	8½

Wire-cut Lug Brick (Dunn)

Inches	Inches	Inches
3	3½	8½
3½	3½	8½
4	3½	8½

SPECIAL BRICK

Hillside Brick (Dunn)

Inches	Inches	Inches
3½	3½	8½
4	3½	8½

Hillside Brick (repressed)

Inches	Inches	Inches
4	3½	8½

Street Railway Brick

Inches	Inches	Inches
3	3	8½ (Fillers)
3	3½	8½
4	3½	8½
4	3½	8½ (Stretchers)

Miscellaneous

Inches	Inches	Inches
4	3¼	8½ (End Cut)
4	3¼	8½

As considerable debate ensued concerning further elimination, a committee was appointed for the purpose of considering the remaining 20 varieties. The committee reported the desirability of reducing the number of sizes so that all brick could be cut out of two clay columns, one 3 inches and the other 4 inches high. It was decided that present demands are such that there must be placed at the disposal of engineers brick to make a wearing surface either 3, 3½ or 4 inches in depth. In the smaller cities a 3-inch pavement is wanted; the larger cities require a 4-inch brick. The state highway departments, on the other hand, find 3-inch brick too shallow for their traffic, and 4-inch brick deeper than necessary, and are therefore specifying a 3½-inch depth. With these three depths considered imperative, the committee found it desirable to eliminate only nine of the varieties over and above those listed above, and therefore eliminated those in the following list:

Depth	Width	Length
Repressed Lug Brick		
Inches	Inches	Inches
4	3	8½
3	3½	8½
Hillside Brick (Dunn)		
Inches	Inches	Inches
3½	3½	8½
Street Railway Brick		
Inches	Inches	Inches
3	3	8½ (Fillers)
3	3½	8½
4	3½	8½
4	3½	8½ (Stretchers)
Miscellaneous		
Inches	Inches	Inches
4	3½	8½ (End Cut)
4	3¼	8½

Some explanation of these eliminations is called for. A 4x3x8½-inch brick was eliminated, even though a fairly large number of that variety is used, because no hardship is imposed by asking the substitution of a 4x3½x8½-inch brick for it, as this brick is of equal depth but ½-inch wider. No freight is saved on the 4x3x8½-inch over 4x3½x8½-inch.

A 3x3½x8½-inch brick was eliminated simply because it has never been widely used, and even though it is the only repressed size with which a 3-inch pavement can be built, it was believed that it would be a mistake to artificially encourage its use by naming it as a standard.

Coming to the eliminations in the various classifications of special brick, the committee has acted on the principle that as far as possible these varieties should be eliminated. Looking to the wide use of the Hillside type, however, it has deemed this use sufficiently important to retain one size in each of the Hillside classifications, that is, to retain only the 4x3½x8½-inch in Dunn Hillside brick, and the 4x3½x8½-inch in the repressed Hillside brick.

All other specials were placed in the non-standard class and therefore the following are eliminated in addition to those classes eliminated in the first discussion:

Depth	Width	Length
Street Railway Brick		
Inches	Inches	Inches
3	3	8½ (Fillers)
3	3½	8½
4	3½	8½
4	3½	8½ (Stretchers)
Miscellaneous		
Inches	Inches	Inches
4	3¼	8½ (End Cut)
4	3¼	8½

With all the eliminations mentioned above, the number of standard varieties would be 11 and the number of sizes 4, as follows:

Width	Depth	Length
Inches	Inches	Inches
3½	4	8½
3	4	8½
3½	3½	8½
3½	3	8½

The varieties, therefore, that would be retained are as follows:

Width	Depth	Length
Plain wire cut brick (Vertical Fibre Lugless)		
Inches	Inches	Inches
3	4	8½
3½	4	8½
Repressed Lug Brick		
Inches	Inches	Inches
3½	3½	8½
3½	4	8½
Vertical Fibre Lug Brick		
Inches	Inches	Inches
3	4	8½
3½	4	8½
Wire-cut Lug Brick (Dunn)		
Inches	Inches	Inches
3½	3	8½
3½	3½	8½
3½	4	8½
Hillside Lug Brick (Dunn)		
Inches	Inches	Inches
3½	4	8½
Hillside Lug Brick (Repressed)		
Inches	Inches	Inches
3½	4	8½

A Public Laundry in a Bath-house

The Interesting and Successful Experience of Baltimore, Md.

By Robert F. G. Kelley

Secretary and Superintendent, Free Public Bath Commissioner, Baltimore, Md.

THE first thought that comes to your mind will probably be, "Why the need of a public laundry?"

I am going to tell you of twenty-one years' experience that Baltimore has had, and perhaps, as the story unfolds, you may see that there was such a need in Baltimore, and is such a need in the average large city of to-day.

About the year 1899, when the Public Bath Commission of Baltimore was about beginning the erection of the city's first indoor bath-house, several of the Commission went to Philadelphia to make a study of the public laundry there. We had understood that women brought their home washing and ironing and did it in rooms set aside for that purpose. After a thorough investigation, the plan seemed good, and in Baltimore's first bath-house, built in 1900, this feature was incorporated. This house, located at 131 South High Street, is in a thickly congested neighborhood, consisting largely of people of foreign birth, and is not far from the public wharves.

In making the first schedule, we allowed four days a week for women to do their family wash, and two for men to do their personal laundry. After several years of experiment, it was found that this schedule had to be altered somewhat, as the demand from the men was much larger than that from the women.

By the year 1920 the type of population had changed, and we found that comparatively few women were doing their family wash, while on the days set aside for men the laundry was much congested, on some days as many as one hundred men being present. It was then decided to make it

WOMEN'S DAY AT THE PUBLIC LAUNDRY, WALTERS BATHS NO. 41, BALTIMORE, MD.

exclusively a laundry for men, and the large patronage, nearly 7,000 in 1920, proved that this was a wise move. For the first four months of 1921, because of unemployment, the attendance was much larger than ever, a total of 3,875 having been recorded, an increase of 1,585 over the corresponding months of 1920.

In order to give some idea of the scope of the work, I am now going to take you through the laundry with John Smith, who is desirous of cleaning up.

John walks into the bath-house, goes up to the window, and hands the attendant 10 cents. For this he receives a towel, a half-ounce piece of toilet soap, and a ticket. Another attendant shows him to a cabin, where John proceeds to take a bath.

After his bath he puts on his trousers and coat; the rest of his belongings he carries on his arm. He then presents his ticket to an attendant, who gives him about one-third of a bar of laundry soap, and John goes down to the laundry.

Here he is assigned to a set of laundry tubs with plenty of hot and cold water, and he begins his family wash. He may think that his coat and trousers also need washing; if so, he does it. Perchance he may have brought a blanket along; others have done so. When he has finished his washing, he wrings out his clothes and places them in racks in a drying-room.

He will then sit on a bench for about a half-hour, pull out his pipe and smoke, while his clothes are drying. Perhaps he may discuss the topics of the day with some of his neighbors. When his clothes are dry, he proceeds to dress, and then walks out with a smile on his face, a clean man, and, we think, a better man.

Who is John Smith?

He may be an oyster dredger, just up from a long trip of hard work down the bay. Or perhaps he is living in one of the cheap lodging-houses near-by, doing odd jobs and making just enough to keep body and soul together. Sometimes John is a cripple, who must lean on his crutches at the laundry tub to wash his clothes. Just as likely as not, he may be a tramp passing through, who has heard from another of the chance to clean up.

Sometimes he is sent from one of the Rescue Homes by the manager, who requests that John have a chance to clean up. In this case, and many others, the 10 cents is missing, but John is not turned away on that account, and receives the same attention. During the late war, he was represented in many cases by a uniformed man, who did not always have the opportunity at camp to clean up. In his case no charge was ever made. It is a touching scene to look at forty or fifty John Smiths washing their soiled underclothing. Like the Indian coolies, they carry all their earthly belongings on their backs.

From a City-wide Congress Report on Baths, published several years ago, we quote the following:

"No more far-reaching philanthropy exists in our midst than this splendid means to health, comfort and cleanliness. As we watched a party of sturdy oyster dredgers emerge from the building (Walters Baths No. 1) last Saturday, immaculate, and with heads erect, themselves and their clothes freshly laundered, we wondered if Mr. Walters' other princely benefaction, the Art Gallery, was more highly appreciated in its effects."

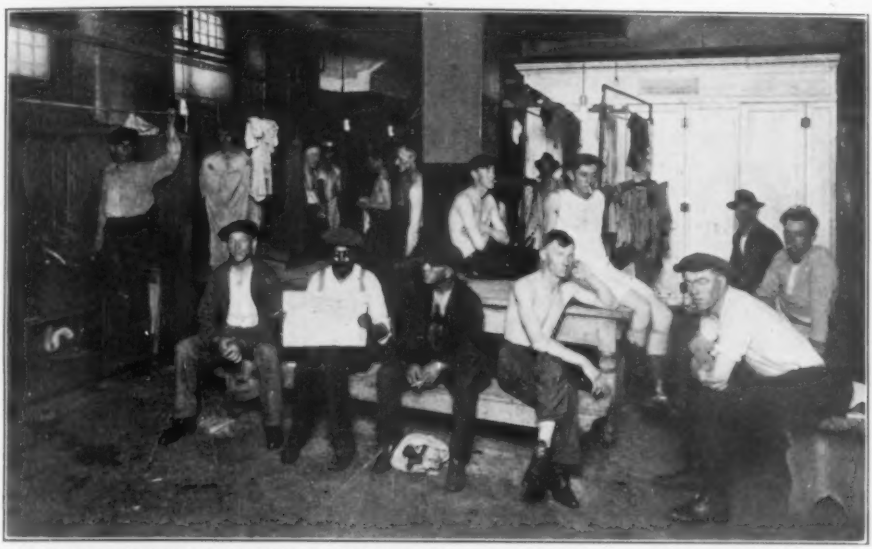
The Women's Laundries

Encouraged by the success of the laundry at Walters No. 1, in our next four bath-houses we provided laundry facilities. As these were located in residential neighborhoods, their use was confined to women. Because of large patronage in two of these houses, it was necessary afterwards to enlarge the facilities.

In order that you may better understand the work, I am going to take you through one of the laundries with Mrs. Jones.

Through a neighbor, or perhaps through an advertising card which she has found under her door, she decides to give the laundry a trial. Gathering up her family wash, she proceeds to the bath-house and finds that there is a side entrance to the laundry room. Here she is greeted by a matron, who gives her a small numbered card and assigns her to a set of tubs.

By consulting this card, she finds she can purchase soap, starch and bluing at the same prices she would have to pay at the corner grocery. She then proceeds to draw her steam and boil her clothes, afterwards using the wringers attached to the tubs. The clothes are now ready to be dried and she is assigned several racks in the drying-room. In a short time the clothes are dry and she is given an ironing board and several irons, so that she can complete her job.



AT THE WALTERS BATHS NO. 16, BALTIMORE, MD., THE MEN CAN DO THEIR PERSONAL LAUNDRY

Work done, the card is consulted, and she finds that she has spent four hours in the laundry—cost 20 cents, bar of soap 6 cents (if any is left over, she takes it home), bluing 1 cent, starch 1 cent, making a total of 28 cents. For this sum she has been able to do a large family wash. In addition, she has worked in a pleasant room, avoided many discomforts which she would have had at home, and has met some neighbors and had a nice chat.

I had almost forgotten to say that Mrs. Jones took her two children, aged three and five years, with her, and while she was washing and ironing they were in the playroom, a small section set aside for that purpose, having a good time with some toys.

Why was it necessary for Mrs. Jones to go to the public laundry? Could she not have done her washing at home and saved herself trouble and expense? To the dweller in the average large city this question would surely seem superfluous.

Perhaps Mrs. Jones lives in two or three rooms in a tenement, which could hardly be called a home; or, if she is fortunate enough, perhaps in a small house, which, however, contains no yard for drying purposes. Try to imagine her under situations like the above: building her fire, drawing her water and pouring it into a galvanized tub, heating her water, then bending over and rubbing her clothes, then the hand wringing, then the placing of the clothes somewhere to dry, afterwards the ironing in a hot room. Surely wash day must be a torture under conditions like these.

In many cases, young women boarding in the city, who have no other means of keeping their clothing clean, take advantage of the facilities at the laundries.

By far the largest class that use the laundry are the colored people who patronize Walters Laundry No. 3, which is set aside for their exclusive use. These colored women live in alleys or in crowded tenements in the larger streets. They are typical of the colored population in Baltimore—house servants, wives of laboring men, etc., and to no class do the public laundry facilities bring more advantages.

For the year 1920 the attendance at the laundries was as follows:

Walters No. 1—For men only	6,799
Walters No. 2—For women only	3,737
Walters No. 3—For colored women	13,998
Walters No. 4—For women only	3,943
Greenm't Ave—For women only	2,478
Total	30,955

Dr. Donald B. Armstrong, of New York, in an article that appeared several years ago in THE AMERICAN CITY,* speaking of laundries, wrote as follows:

* December, 1913, page 526.

"There are about fifteen such institutions in America, five of which, and by far the best of them, are in Baltimore, Md."

He closes his article with these strong words as a plea for the establishment of similar places in New York City:

"The public wash-house, like the public baths, finds its chief justification in the fact that it gives to the people an opportunity to learn how to be clean, and makes it possible for them to appreciate the value of health and decency in being physically clean. Physical cleanliness enhances their moral and spiritual tone. They will recognize more acutely their housing defects and will demand even more energetically than at present that equipment for the home which they have learned to use and value outside, and the importance of which, for the preservation of health and the maintenance of decency, they have been educated to appreciate."

In conclusion, we should like to make the following suggestions to city officials contemplating installing laundry facilities:

First, by all means a small playroom should adjoin the laundry, where mothers can leave their children while doing their washing.

Second, in many cases advertising is necessary at the beginning. At several of our houses we gave away cards which entitled the bearer to use of the laundry twice, free of any charge.

Third, employes should be selected with care, as a poor employe can kill a laundry.

A Substantial Highway Sign-Post

WITH the large number of highways extending north and south, east and west on this continent, promoters and highway departments are aiming to produce individuality in the sign-posts on certain highways. The sign-post shown in the accompanying illustration is one of many which have been placed at mile intervals along a western route. It is not radically different from many others, but it does typify good, substantial design, which gives it individuality. The post is of reinforced concrete, 4 by 6 inches, and the slabs 2 inches thick, 30 inches high and about 40 inches long The whole post is securely anchored in a concrete base with the top trowelled off, and the edges squared so that in case of erosion about the base it will not have a jagged and run-down appearance.

The letters and figures are made by imbedding the type in the soft mortar. This leaves each symbol in the form of a depression, and after the sign is painted it will keep its keen contrast much longer than if the symbols were flush with the rest of the slab. Special moulds are easily made and the signs turned out at a slight cost.

Courtesy Alpha Portland Cement Company

A REINFORCED CONCRETE POST

The Central Heating Plant—A Public Utility

Chicago Demonstrates Value of Recording Flow Meters in Distributing Heating Load, and Reduces Smoke Nuisance

By J. C. Butler

THE story of central station heating in Chicago, as carried on by the Illinois Maintenance Company, contains several points of interest to municipalities: first, it might be considered in smaller communities as a municipal enterprise; second, the use of recording flow meters in checking up the use of steam by different buildings makes it possible to distribute the load economically; third, the installation of either privately or municipally operated central heating plants is a great factor in reducing the smoke nuisance.

Central station heating in Chicago had its beginning many years ago when steam service was supplied to small buildings adjoining a larger building in the same block, the service being given by the larger as an aid in overcoming the smoke nuisance from the smaller boiler plants. It was on this basis that the Illinois Maintenance Company, as well as many private building owners, began to distribute steam in Chicago, the piping being run in the basements of buildings in the same block as that in which the steam generating plant was situated, thereby eliminating the expense of placing piping in the city streets and alleys.

It has been only within the past few years that the tie lines have been installed between steam generating plants, thereby protecting the service and making it possible to effect certain operating economies that could not have been obtained otherwise. The system, as now operated by the Illinois Maintenance Company, comprises six steam generating plants, together with buildings and customers in thirteen city blocks in the loop district of Chicago. This is only a part of the entire system operated by the company. The benefit of such a system of steam distribution is great, as it is possible to supply a total of 49 steam customers from 6 boiler plants, 18 of whom formerly operated their own individual boiler plants, and 26 of whom would have had to install boilers of their own had not the outside steam service been available. In this way it has been possible to concentrate the smoke to a maximum of 6 stacks, instead of a possible 44. The fuel is burned in a more efficient boiler plant located in the larger buildings with stack extending above the surrounding buildings, which it would be impossible to do in each individual building.

In a system of this kind it is possible to reduce or to increase the number of boiler plants in service at any one time as the seasons change; all the load is carried from one plant during the summer months, and the other plants are cut in or out as the case may be, depending on the outside temperature conditions. Before connections were made between the boiler plants of the system, the engineer in each plant knew the character of his load and could govern his plant-operating conditions accordingly, but under the present system it is necessary to have a load dispatcher who notifies the engineer as to what procedure he shall follow.

Handling the Load

With boiler plants and customers scattered over 13 city blocks, it was a problem as to the best method of obtaining the information necessary for the proper handling of the load conditions and boiler-plant operation. Consequently, a switchboard containing 14 recording and integrating Republic flow meters and two Bristol long-distance recording pressure-gages was placed in the office of the chief operating engineer, and this, together with the telephone, was considered sufficient for the operation of the system.

The accompanying illustration gives a series of curves showing the average load on the system for each hour of the day for different outside temperatures. From this it can be seen that during the summer months, when the temperature is 70 degrees Fahrenheit or warmer, the average day load

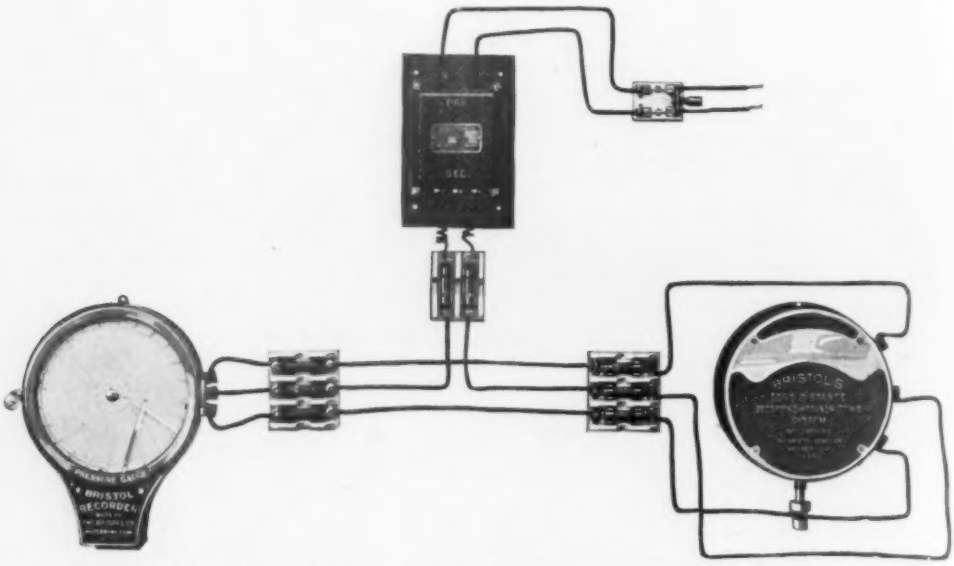
is approximately 39,000 pounds of steam, but the night load is 15,000 pounds of steam and the load factor for the months of June and July is approximately 50 per cent. A mean daily outside temperature of 60 degrees Fahrenheit introduces short-hour heating, by which the customer has heat on in the morning for three or four hours and then cuts it off for the remainder of the day. It is during such periods that the load dispatcher must watch his load carefully and get his boilers in and out of service so as to reduce the plant losses to a minimum and still keep up the required steam pressure, which is quite essential where hydraulic elevator equipment is on the system.

As the weather becomes colder, 24-hour heating is required and the load curve flattens out, giving a high load factor, usually 70 per cent for the months of December, January and February. The average yearly load factor for the system is approximately 33 per cent, the maximum half-hour load being at a rate of 220,000 pounds of steam per hour for an annual steam consumption of 633,700,000 pounds.

The Metering System

To make the metering system as flexible as possible and also provide for future extensions and additions, lead-covered telephone cables were run along the main steam lines, openly or in conduit, depending on their exposure to injury. Potheads and terminal boxes were placed at all important points so as to make it easy to connect in any additional meters or gages.

The steam generating plant in the Edison Building being the central plant and the one that is operated at full capacity most of the time, meters were placed on the individual boilers. All other meters were placed on main steam lines or service connections with large loads. In this way the necessary information can be obtained with a minimum of instruments. The instruments are so grouped on the meter board of the chief operating engineer's office that the load dispatcher can make his necessary calculations and decisions with the least possible delay. As all the steam is transmitted at a pressure of approximately 120 pounds and is used for operating pumping equipment, as well as for cooking, refrigeration, heating water, heating, etc., it is quite essential that a uniform pressure be maintained. For the purpose of checking the pressure and keeping a record of it, long-distance electrically operated pressure-gages are connected at two of the more critical points in the system,



TYPE OF LONG-DISTANCE RECORDING DEVICE USED IN CHICAGO CENTRAL HEATING PLANT

and the recording instruments are placed where they will be in view of the load dispatcher. The recording instruments are all equipped with 7-day clocks, and 7-day charts are used. The clocks on the flow meters operate electrically from the master clock of the building. This eliminates the winding of clocks by hand, and the 7-day charts reduce the changing of charts to a minimum. For accuracy the recording instruments are read each hour during the critical periods of the day. The load dispatcher collects and compiles all data, posting the load curves hourly, so that the chief operating engineer may know what is going on in the system at any time.

The Meaning of Good Roads

POOR ROADS MEAN HARD HAULING FOR LIGHT LOADS AND THE IMPOSSIBILITY OF HANDLING HEAVY LOADS

Short-sighted financial policies never provide long stretches of modern highway.

Don't expect roads over night. Your engineer cannot substitute a magic wand for his blue-print.

Highway News Digest.

THE SMOOTH HARD-SURFACED HIGHWAY INCREASES TRANSPORTATION FACILITIES AND IMPROVES PROPERTY VALUES

The Board of Appeals in Zoning

By Edward M. Bassett

Counsel of the Zoning Committee of New York

THE main difficulty in establishing a zoning plan is to make it effective and at the same time avoid arbitrariness. Human wisdom cannot foresee the exceptional cases that can arise in the administration of a zoning ordinance. The strict word of the law may sometimes be the height of injustice. No zoning ordinance standing by itself can provide for the proper adaptation of the spirit of the law to each exceptional case. On this account, in the administration of building laws in general and especially zoning ordinances, it has been found desirable, even necessary, to create an expert board, usually called a board of appeals, to adapt the application of the law to particular exceptions so as to carry out the spirit of the law instead of allowing it to be arbitrary or confiscatory.

A city cannot create such a board without authority from the state legislature to do so. Therefore, any state enabling act to authorize cities to adopt zoning ordinances should contain a provision empowering the city to appoint such a board and outlining its functions. Merely to say that a city can appoint such a board to do what is just or lawful is not enough, and probably such a statement in the law gives the board no power whatever. The state enabling act must either prescribe the rules that it must follow or, better yet, empower the city council to assign to it in the ordinance certain specified classes of exceptional cases for it to decide. The council should also prescribe a rule for it to follow in deciding each class of cases.

Such a board should be given three distinct fields: first, to rectify errors in granting or refusing permits; secondly, to pass on exceptional cases where specified in the ordinance itself; and third, to vary the literal requirement of the law where unnecessary and excessive hardship is caused and the intention of the law is equally accomplished by an alternative method to be prescribed.

The state enabling act should provide for the review of the decisions of a board of appeals by the court. This court review, however, should not be a substitution of the judgment of the court for the judgment of the board of appeals. The findings of an expert board should not be interfered with by the court unless the board has exceeded its lawful powers or misinterpreted the law or abused its discretion. In states where under such circumstances the courts will not assume this position, the enabling act should require it.

Personnel of the Board

A board of appeals may well be composed in part of officials whose duties bring them in touch with buildings and their use throughout the city, and in part of non-officials expert in such fields as design, construction, fire protection or sanitation. As a rule, the official who issues permits in the first instance should not be a member of the board of appeals, because it is better that he should not be compelled to act on his own prior decisions. Neither should a member of the city council be on the board, because of the difficulty of his acting as a legislator in one position and as an administrator in the other.

Inasmuch as exceptional situations only come before a board of appeals, there is always a presumption that the applicant should observe the strict letter of the zoning ordinance just the same as all other citizens. Therefore, if an exception is to be made in his case, the vote of the board should be greater than a mere majority. In other words, an applicant desiring an exception should be able to convince a large proportion of the board. On the other hand, it should be possible for a mere majority to refuse to make an exception, so that there may be a decision of denial on which the applicant can ask for a court review. This distinction has been made.

Separate Functions of the City Council and the Board of Appeals

States and cities will not go far afield when they came to define the functions of the council and the board of appeals if they will remember that the council is the city legislature and as such has entire control

over the zoning ordinance and maps. The board of appeals should have no control over the ordinance and maps but should pass on specific permits arising under the provisions of the ordinance and maps. The council then has its own field and the board of appeals its own separate field, and these do not overlap. The council does not adjudicate on a particular building or the use of a particular building. The board of appeals passes on nothing but particular buildings. The council impresses a certain quality on the land itself. The board of appeals in certain exceptional cases varies the application of the ordinance for a building or use which may temporarily occupy the land.

Complaints will always be made against boards of appeals, and probably such boards will always abuse their discretion once in a while. If, however, a city administration is not competent to establish a good board of appeals, it probably is not competent to administer a zoning ordinance fairly. An occasional wrong decision by a board of appeals is of less importance to the community than the unrelieved arbitrariness of an iron-clad ordinance which, first in one particular application and then in another, may be criticized by the courts. A board of appeals should ameliorate the exceptional instances where alone lies the danger to the entire zoning plan, for, as the courts have repeatedly said, the integrity of a zoning plan under the police power depends on its not being arbitrary.

A Narrow Parkway That Was Abandoned

SOMERVILLE, MASS., has abandoned the attempt to have a parkway of a mile or more in length along Broadway, from the Boston line to the top of Winter Hill. The parkway has been in existence nearly ten years, and has been declared a failure. It was figured out that Broadway was wide enough so that a narrow strip in the center of the street between the tracks of the double-track street railway could be utilized for the growing of grass and small shrubbery, adding to the beauty of the city. Finally, the rails were set 9 feet apart, and a 3-foot strip between them was sown to grass and planted to shrubs.

From the first, the jay-walkers disregarded it, crossing the street where convenience dictated, regardless of a parked strip. Some teamsters, some drivers of pleasure wagons—though the latter have disappeared, motorists have succeeded them—disregarded the attempt to make a beauty spot. Then the street railway used salt to keep away the snow and ice in winter, and more or less oil was deposited there. All these things spoiled the grass and shrubs.

The question was whether the city should make another attempt, rebuild the parkway and employ policemen enough to keep it protected inch by inch, or abandon it. It was abandoned by vote of the city government, and the remnants of grass and shrubbery have been replaced by broken stone. It is said that the city fathers would like to see three or four feet of that space added to the width of Broadway, where automobile traffic has become heavy since the parkway attempt began.

This experience of Somerville suggests that in planning for parkways it will be well to make them wide enough so that the street will have the appearance of being two separate streets instead of one street, and that the city might well go to the expense of setting curbs to protect the parking from the incursions of vehicles.

A Correction

In the article "A Survey of the Salaries of Police and Police Departments," by Lucius H. Cannon (THE AMERICAN CITY, December, 1921, page 459), appeared the statement that patrolmen in Harrisburg, Pa., receive $750, the smallest salary paid to patrolmen in any of the 70 larger cities of the United States. This is incorrect: police constables, first grade, receive $1,500; second grade, $1,440. These figures have obtained since January 1, 1920; before that, the annual salary paid to patrolmen in Harrisburg was $1,380.

The Municipal Apartments of Paris Help Solve the Housing Problem

By Herbert M. and Lilliane R. Davidson

LIKE other cities, Paris has for a number of years been troubled by a lack of clean, cheap dwellings, but there are at present completed and ready for occupancy fourteen municipally owned and operated apartment houses containing nearly 2,000 apartments.

The municipal apartment house project in Paris was inaugurated in 1913, when a bond issue of 200,000,000 francs was voted to construct houses in Paris which should combine the three qualities of sanitation, beauty, and economy. A fair was held to investigate materials and construction which would be at the same time cheap, durable, healthful and comfortable. A contest was instituted in which architectural plans for the houses were selected. Five prizes were awarded, and it is according to the model which won first prize that the first group of fourteen houses has been built.

Next, large strips of land were set aside from the city's parks and promenades, chosen in such a way as not to interfere with the beauty and adequate size of any public place. Of these, a strip on Avenue Emile Zola was chosen as the site for the first group.

The war of course interrupted this program, but the housing crisis which followed the war called for its immediate revival. Work was started in spite of the greatly changed financial conditions. It was originally planned that the city should get back the sum invested in 75 years. Under present conditions this is believed impossible, as the cost of construction has increased from three to four times. At the time of the Armistice, Paris had to choose between abandoning her housing project and taking a severe loss. She chose the latter course. In spite of a slight additional sum raised and the scheduling of rents rather higher than those planned originally, Paris will have to meet a large bill on the project. Under present conditions it will take the houses from one hundred to one hundred and twenty-five years to pay for themselves.

Now how are these apartment houses rented? First of all, preference is given to workmen and the small-salaried clerical class. Although it is believed that, in general, economic laws will operate to send the renter of small income to these cheap houses, inquiry is made as to the status of the proposed tenants, and apartments are rented only to those who could not otherwise afford such pleasant and hygienic lodgings. Secondly, these apartment houses are designed boldly and unashamedly to favor families with children, and the more the merrier. Two-thirds of each house is reserved for families with four children under 16 years, and for every child under 16 belonging to a renter of one of the municipal apartments, the fortunate father is allowed a rebate on his rent. Families without children must be content to pay a higher proportional rent for smaller, less desirable apartments. Finally, the rents charged are at least one-third less than those charged in privately

OLD BUILDINGS OF THIS SORT ARE BEING TORN DOWN TO BE REPLACED BY MODERN MUNICIPAL APARTMENTS

THOROUGHLY MODERN APARTMENT HOUSES, BUILT BY THE MUNICIPALITY, ARE HELPING TO RELIEVE THE ACUTE HOUSING SITUATION IN PARIS

owned houses of somewhat poorer grade. The range probably will be from 300 to 800 francs a year. The maximum charge permitted under the law is 1,038 francs a year.

The prize-winning plan from which the houses are being built is an admirable piece of work. Every apartment opens on the street, giving not only ventilation but a view to every tenant—all of which is only another way of saying "all outside rooms." There are only two main entrances, making necessary only two *concierges*, which is French for janitors. Halls, which customarily tafle up great quantities of room in France, are reduced to a minimum.

There are five types of apartments, varying from the largest, containing three bedrooms for children, one of them double, one parents' room, one kitchen and one dining-room, to the smallest, comprising only one room with a kitchenette.

In addition to the group of apartments completed in July, construction plans include a new group of five apartment houses containing 400 flats each. These will cost from 17 to 25 million francs each to build.

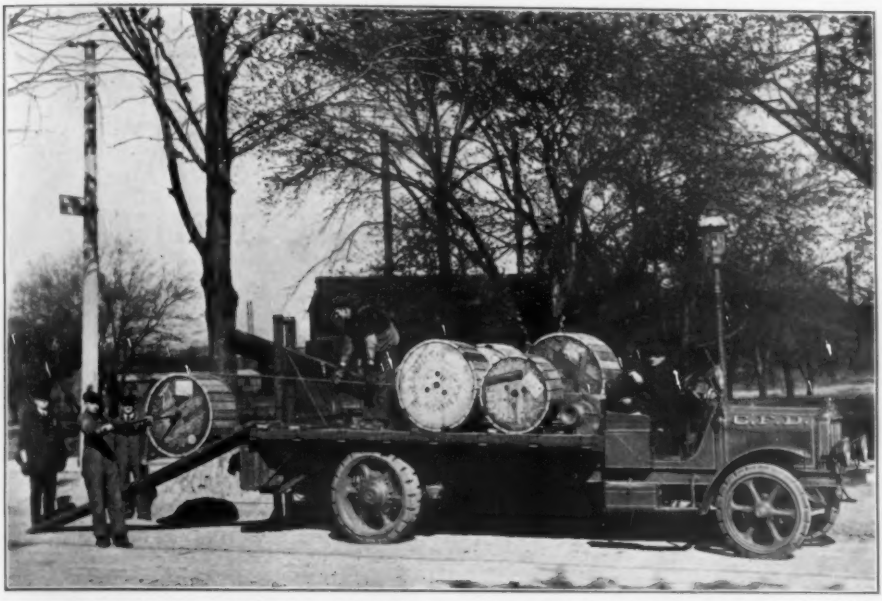
With future building in mind, the city of Paris has recently held in the Zoological Buildings in the Bois de Boulogne another exhibition of methods and materials of construction, with a view to finding some means of erecting houses more economically still, and especially of finding some cheaper building material than brick and stone.

Make no little plans. They have no magic to stir men's blood and probably themselves will not be realized. Make big plans, aim high in hope, and work, remembering that a noble logical diagram once recorded will never die.—*Daniel Burnham.*

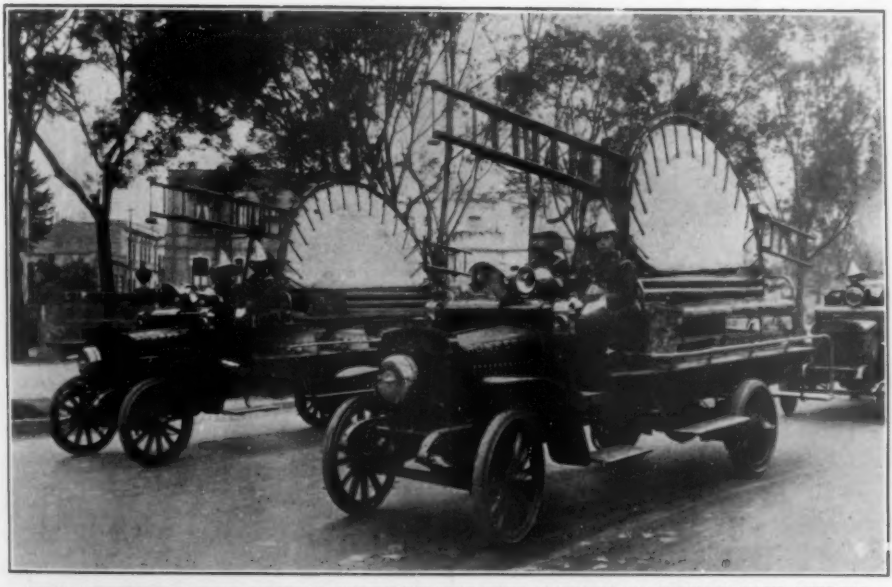
Motorized Municipal Equipment

A STANDARD TRUCK USED FOR HAULING BALLAST BY THE DEPARTMENT OF STREET RAILWAYS, DETROIT, MICH.

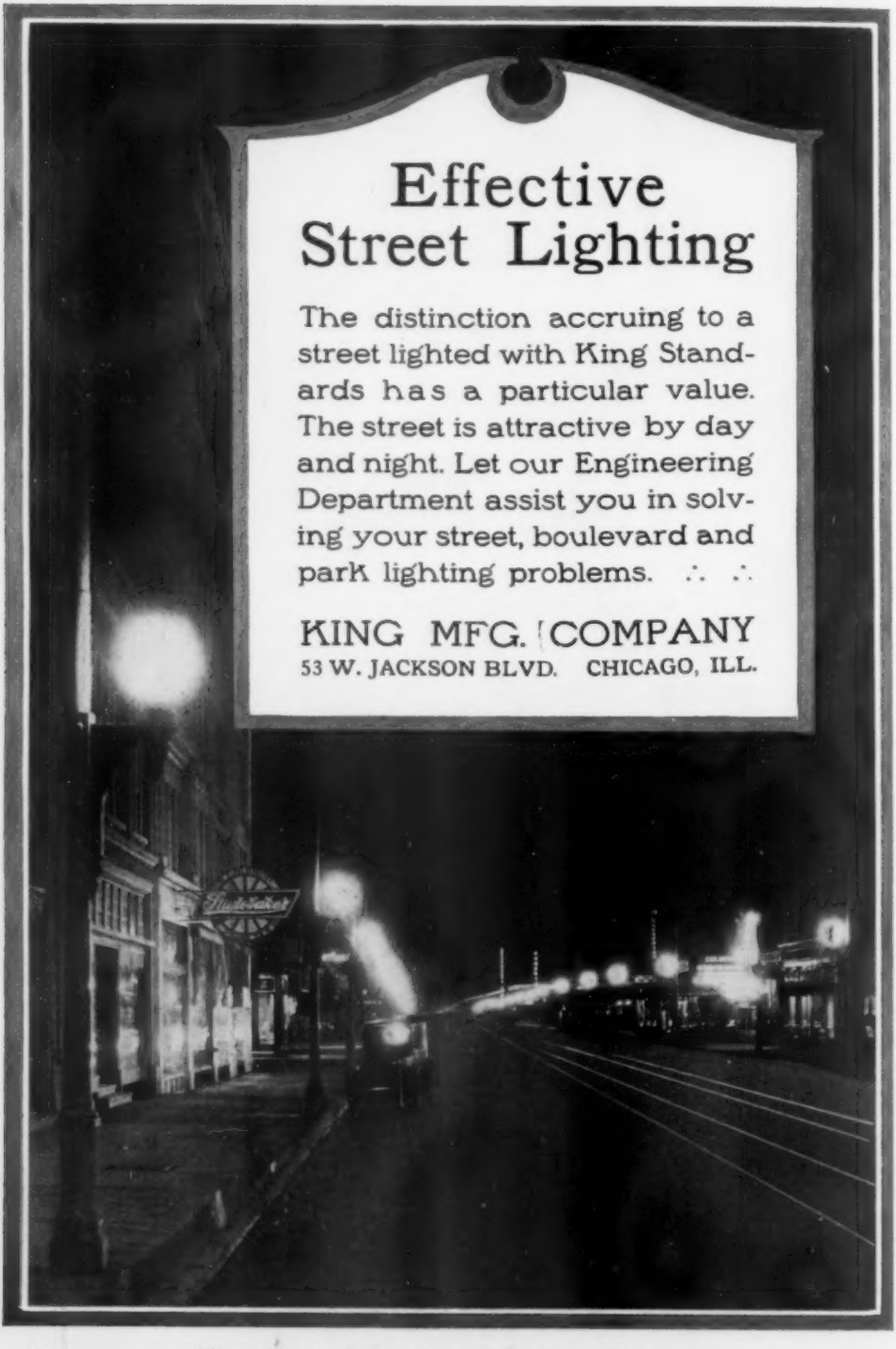
A MACK TRUCK ENGAGED IN HEAVY HAULING IN BUENOS AIRES, ARGENTINE



THE CLEVELAND, OHIO, FIRE DEPARTMENT USES THIS 3-TON WHITE TRUCK TO HANDLE THE FIRE ALARM TELEGRAPH CABLE AND OTHER DEPARTMENT HAULING



TWO ATTERBURY FIRE TRUCKS RECENTLY PUT INTO SERVICE BY MEXICO CITY, MEXICO. THE DEPARTMENT IS ALMOST COMPLETELY MOTORIZED WITH APPARATUS OF AMERICAN MANUFACTURE


Effective
Street Lighting
The distinction accruing to a street lighted with King Standards has a particular value. The street is attractive by day and night. Let our Engineering Department assist you in solving your street, boulevard and park lighting problems. ∴ ∴
KING MFG. COMPANY
53 W. JACKSON BLVD. CHICAGO, ILL.

Chamber of Commerce Activities in Public Affairs

"It Couldn't Be Done—But They Did It"

WILKES-BARRE, PA.—With a critical housing shortage on one hand and prohibitive building costs on the other, the Greater Wilkes-Barre Chamber of Commerce has put across another one of those "can't be done" achievements by erecting forty-seven houses at prices that are actually down to the 1914 level.

The funds needed were approximately a quarter of a million dollars. Business men agreed to furnish one-half, and an old line insurance company to lend the other half on a first mortgage. A Community Housing Corporation was formed to finance and manage the proposition. A tract of land was purchased on the banks of the Susquehanna overlooking the Wyoming Valley and subdivided into lots and streets, so grouped and arranged as to avoid the usual line-up of "company houses." Great pains were taken in selecting the type of houses. The single six-room, two-story house predominates, with a few double houses, some with seven rooms to a side, others with six rooms on one side and five on the other. The construction is three-ply stucco on metal lath, back-plastered, full cement basement, hot air heat, slate roof, all modern conveniences, sidewalks in and street graded. The cost of these homes ranges from $4,600 to $5,300.

The plan of payment at absolute cost to the buyer is as follows: A 20 per cent payment down was required. On completion of the home, monthly payments begin at the rate of about 1 per cent of the balance due. This is applied on both interest and principal and also takes care of taxes and insurance, all being handled through the Housing Corporation, which retains title until the last payment is made. Some, of course, paid all cash down, but most of the buyers took advantage of the eleven-year term in which to acquire a home on payments which were but little more than the same house would rent for.

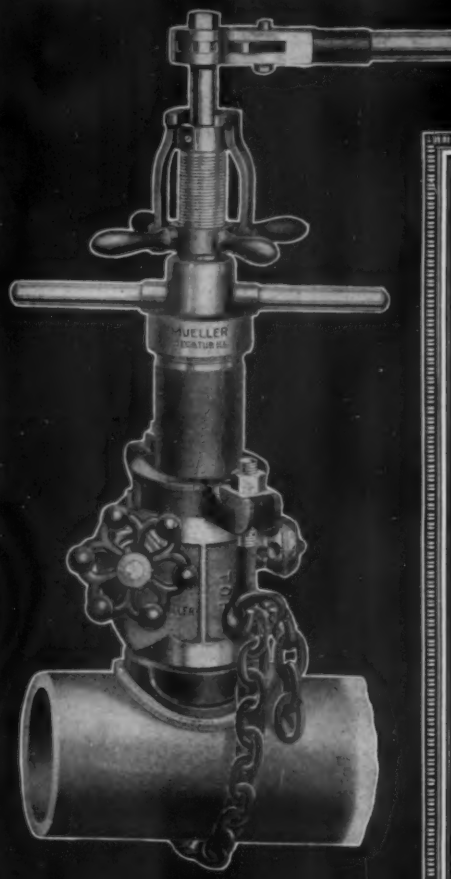
An intensive publicity campaign through the newspapers was used, with a sketch of the houses, single and in groups. An exhibit was also placed in store windows and in the Chamber of Commerce Auditorium.

Most of the houses were sold before the first shovel of dirt was turned, and this later event was made the occasion for a formal ceremony which marked the actual beginning for many of the dearest spot on earth—a home.

The whole building contract was given to one contractor, who figured on the closest possible margin and made the statement that it would cost an individual at least $1,000 more to reproduce one of these houses than the price at which they were offered by the corporation. This was verified later by the insurance company in valuing the property for the purpose of placing its loan, and also by the fire insurance companies in underwriting the fire risk.

A SINGLE-FAMILY HOUSE BUILT BY THE WILKES-BARRE, PA., COMMUNITY HOUSING CORPORATION

The real purpose of the undertaking, that is, the stimulation of home building, was realized before the publicity campaign was over, as was evidenced by the promotion of



Repair Time

Send in your Tapping Machine for repair this month—don't wait until you need it. *MUELLER* can give you quick service—*Now.*

MUELLER "B" TAPPING MACHINE

here illustrated, embodies all the new *MUELLER* improvements. It will tap and insert corporation cocks from ½" to 1"—and will tap *only* up to 2".

Detailed descriptions and prices on request. Don't neglect sending in your old machine for repairs—right away.

H. MUELLER MFG CO.,
Decatur, Illinois

Water, Plumbing, & Gas Brass Goods & Tools

New York City, 145 W. 30th St. Phone Watkins 5397

San Francisco, 635 Mission St. Phone Sutter 3577

Sarnia, Ontario, Canada

Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Brass and Copper Tubing; Forgings and Castings in Brass, Bronze and Aluminum; Die Castings in White Metal and Aluminum; also Screw Machined Products.

A FEW DOUBLE HOUSES WERE PUT UP BY THE WILKES-BARRE HOUSING CORPORATION. THE SUCCESS OF THIS CORPORATION HAS ENCOURAGED PRIVATE BUILDING

several home-building projects through real estate agencies, which up to that time had taken the stand that "there ain't no such animal," but were willing to venture after the way was paved.

This experiment in solving the housing problem simply shows that with unity of purpose, concentration of effort and cooperation in handling the project on a large scale, homes can be placed in reach of the average wage-earner, who is unable to cope with the situation single-handed.

C. H. HALL, Civic Department,
Greater Wilkes-Barre Chamber of Commerce.

Chamber Leads Good Roads Campaign

SIOUX CITY, IOWA.—With the completion in November of the concrete road from Sioux City to Moville, the Sioux City Chamber of Commerce realizes the first fruits of its labor of three years ago. It marks the first step in Woodbury County's three-and-a-half-million-dollar road system, for which bonds were voted in 1919. The length of this piece of road is 14 miles from the city limits of Sioux City to Moville, Iowa, and connects with Sioux City's 110 miles of paved streets and highways.

The surface is of the one-course reinforced concrete type. It is 8 inches through, resting on a rolled subgrade, and has a 2-inch crown. It is 20 feet wide and has a 1-foot integral curb on each side, raised 3 inches. The reinforcement consists of half-inch steel bars laid 6 feet apart, crosswise, with three longitudinal bars. They are 2½ inches below the top of the concrete.

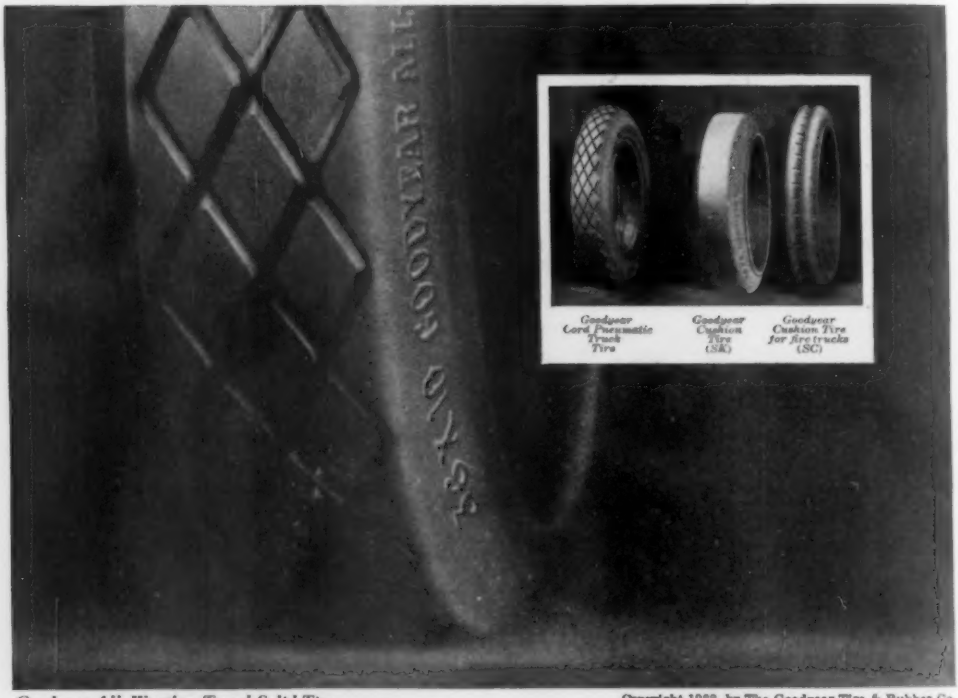
A useful feature is being added by the County Engineer. This is a black line about 3 inches wide running along the center of the pavement the entire length. The purpose is to direct traffic to the right side going in both directions. It is hoped that this will prevent accidents caused by cars staying too close to the center.

The members of the Chamber of Commerce who worked incessantly for months in pushing the election which made possible the issuing of bonds for paving Woodbury County's road will feel well repaid for their work as they travel over the Moville road. No more mud, no more hard hills to climb; instead, there is a smooth, year-round, hard-surface road.

It was about three years ago that the question of how to get good roads was uppermost in the minds of the people in Sioux City and Woodbury County. The Sioux City Chamber of Commerce early took an active part and determined to carry through a road-building program. A strong committee worked incessantly against heavy opposition to secure the proposed law which made possible the voting of bonds for the hard-surface roads. It was at this stage that the Chamber of Commerce, together with other civic organizations in Sioux City, performed one of the biggest stunts ever attempted in the state. They moved the State Legislature to Sioux City. This body of lawmakers came to the city, viewed with enthusiasm the paved highways within the city limits, went back to Des Moines and passed the new law. They had not realized before what concrete roads meant to a community.

Next, the Chamber of Commerce took the

GOODYEAR



Goodyear All-Weather Tread Solid Tire

Copyright 1922, by The Goodyear Tire & Rubber Co.

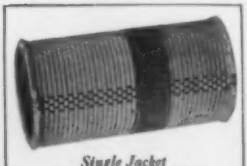
Goodyear All-Weather Tread Solid Tires show remarkable tractive and cushioning qualities in service on heavy duty trucks.

Their All-Weather Tread design furnishes in the 36 x 10 size, for example, 704 inches of sharp gripping edges so that in the heaviest going this tire grips hard and holds to the road.

The height and tread design of the Goodyear All-Weather Tread Tire make it much more resilient than a smooth surface tire and even springier than many so-called cushions. This lasting resilience protects both the engine and the chassis from road shocks and jars.

Much thicker than the ordinary smooth-tread solid tire, they wear much longer.

For lighter and quicker hauling, Goodyear makes other special tires—Goodyear Cord Truck Tires and Goodyear Cushion Tires.



Single Jacket Underwriters Fire Hose

The Underwriters label on Goodyear Single Jacket Fire Hose and Goodyear Monterey Chemical Hose, means that the latter will resist satisfactorily the biting, corrosive action of chemicals and that both will stand a definite pressure per square inch. Goodyear's years of manufacturing experience has enabled the production of hose on a par with all other Goodyear products—hose which will render dependable and economical service.

Monterey Chemical Hose

lead in putting through a $2,500,000 bond issue for the actual hard-surfacing of a county primary road system. This issue, with assessed benefits, will provide more than $3,500,000, to be spent as rapidly as conditions permit. The campaign included liberal use of printer's ink and wide-spread information on the proposed bond issue, which was carried by a large majority.

The entire cost of the road was $51,000 per mile, including grading and finishing. The contract price for the concrete was $3.67 per square yard and $1.12½ per cubic yard for subgrade work.

JOHN D. ADAMS,
Industrial Commissioner, Sioux City Chamber of Commerce.

Business Aspects of a College

POUGHKEEPSIE, N. Y.—The Poughkeepsie Chamber of Commerce is now lending its efforts toward securing the Vassar College $3,000,000 Salary Endowment Fund. The Chamber has undertaken to raise the sum of $30,000 from the business and professional interests of the city as its contribution to the fund.

A unique folder has been prepared and mailed to all the prospective subscribers, in which the advantages of the College to the community are clearly set forth. The pamphlet is entitled "Do We Appreciate It?" and the College is compared to an industry already located or seeking to locate within the city.

It is set forth that the College buildings have a total valuation of $3,305,000; that the annual salaries and wages paid faculty and employes of the College amount to $650,000; that the spending power of the student body (conservatively estimated at $50 per student) exceeds $60,000, and that the cost of supplies purchased by the College in the city of Poughkeepsie equals at least $150,000 per year. It is therefore estimated that approximately $900,000 is annually turned from the College into the various channels of trade of the city.

The prospective subscribers are then asked the following questions:

"What would I give to bring an institution to the city of Poughkeepsie which would spend $900,000 per annum if the same were not already located here?"

"What would I give to keep Vassar College in the city of Poughkeepsie if there were any intention of its moving to some other locality?"

The response to the appeal of the Chamber of Commerce has been very gratifying. Contributions are coming unsolicited to the Chamber offices, and the officers and directors of the organization are confident that the $30,000 requested by the Chamber will be forthcoming. The people of the city in general appreciate the presence of the College, and to date 99.2 per cent of the Poughkeepsie alumni have subscribed to the fund.

R. W. BUDD,
Secretary, Poughkeepsie Chamber of Commerce.

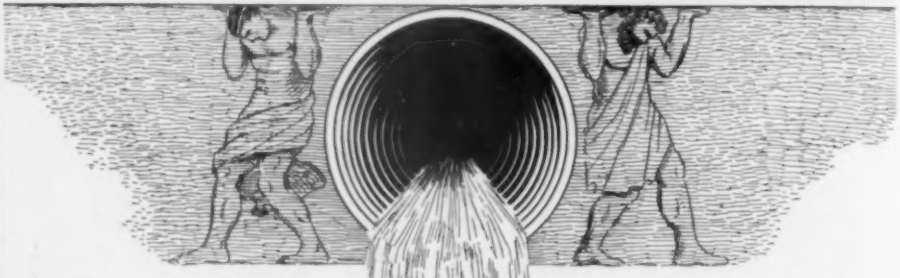
SUCH A SIGN-BOARD IS USEFUL, APPROPRIATE AND BEAUTIFUL

The Doorway to Portsmouth

PORTSMOUTH, N. H.—The photograph above shows one of the new signboards, of which a dozen or fifteen will be erected in this city in the near future. They are the gift of one of the Directors of the Chamber of Commerce. No more appropriate type of guide-board could have been designed, for it is copied from one of the fine old colonial doorways for which the city is famous. The doorway is also a symbol of hospitality. Thus Portsmouth, in addition to erecting sign-boards which are at once artistic, appropriate and distinctive, has chosen a symbol which thousands of tourists, who pass through daily in summer, will recognize as a welcome sign.

H. F. SHERWOOD,
Managing Secretary, Portsmouth Chamber of Commerce.

NEWPORT CULVERTS



Have the supporting strength of Hercules and Samson

Mythology and Biblical history record the great supporting strength of these ancient heroes. The records of many cities, counties and states tell of the great supporting strength of Newport Culverts. The remarkable lasting qualities of these corrugated metal culverts is due to the ability of the metal to withstand corrosion.

Newport Culverts are made of genuine open hearth iron (99.875 per cent pure iron copper alloy), which lasts a lifetime.

Newport Culverts are made in full-round and half-round shapes to make them fit all conditions. Full-round shapes are most serviceable where there is a deep fill and plenty of head room. In those places where there is little fill, the half-round culvert with flat bottom makes the best proposition because of its small height.

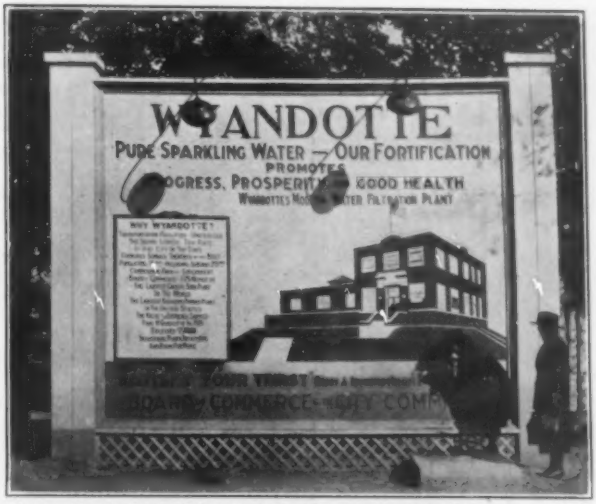
Full descriptive illustrated literature sent free on request.

NEWPORT CULVERT CO., INC.

542 West 10th St. **Newport, Kentucky**

Wyandotte Advertises Its Pure Water

WYANDOTTE, MICH.—The Wyandotte Board of Commerce, in cooperation with Donald M. Hatch, Superintendent of the Water Department of that city, has adopted a novel plan of welcoming the visitors to the municipality and at the same time incorporating some excellent advertising for the city. The large signboard which is illustrated herewith not only shows a view of the new and up-to-date filtration plant recently installed in the city, but also illustrates in a practical way the purity of its water-supply by a bubbling drinking fountain extending out from the face of the sign. There are three of these billboards located at the various entrances to the city, and, as will be seen by the illustration, other advantages of the city are set forth in a panel at the left of the view of the filter plant.



AN ATTRACTIVE SIGN ERECTED BY THE WYANDOTTE BOARD OF COMMERCE

JAMES H. PINSON,
Secretary-Manager, Wyandotte Board of Commerce.

A City Plan for Spartanburg

SPARTANBURG, S. C.—Work on a comprehensive plan for the city of Spartanburg has begun. The contract with Dr. John Nolen, of Cambridge, Mass., was signed October 3, the city, the Park Commission and the Chamber of Commerce each agreeing to bear one-third of the expense.

At a meeting of the Members' Forum of the Chamber of Commerce, held February 23, 1920, Professor B. O. Hutchinson, of the Faculty of Converse College, offered a resolution recommending that the Board of Directors of the Chamber of Commerce take steps to secure a city plan. This resolution was adopted by the Board, and a committee on city planning was appointed.

For the past year and a half the committee named by the Directors of the Chamber of Commerce has been busy working toward the objective proposed in the resolution. Dr. Guy E. Snavely, the chairman, was sent to Cincinnati to attend the Conference on City Planning. He returned more enthusiastic than ever over the project. Carl F. Pilat and John Nolen came to Spartanburg by invitation and delivered addresses before large numbers of citizens assembled at Forum meetings at the Chamber of Commerce.

When the South Carolina Legislature gave the Spartanburg Park Commission city planning authority, the Chamber of Commerce passed a resolution guaranteeing one-third of the cost of a city plan, provided the other two-thirds were carried by the city and the Park Commission.

Before the contract for the city plan was signed, the Park Commission was developing Cleveland Park, in the northern part of the city. This park, which is half completed, will have a lake covering three acres, tennis grounds, a baseball diamond, a club house and picnic grounds. For this work the city voted $50,000 in bonds, and John B. Cleveland, a prominent citizen, donated a large tract of land for the park.

For several years the Chamber of Commerce and many business interests have felt the need of an industrial survey of the city. It now transpires that the work undertaken will in a large measure include an industrial survey in connection with the city plan. This information will be of immense benefit to the Chamber of Commerce.

D. G. SPENCER,
Publicity Secretary, Spartanburg Chamber of Commerce.

Northern Fire Apparatus

Northern Equipped, Cadillac "8" Chassis. In Service in Redwood Falls, Minn.

Our Liberal Selling Policy

—boosts local business of your city. You pick your favorite chassis, and go to your own truck dealer to get a price quoted on it, Northern Equipped. Your dealer gives the matter personal attention. His shop becomes your service station when the job is delivered.

The Northern Is Guaranteed

Under our sales plan you have not only the personal attention of a dealer you know, but also the liberal guarantee and international reputation of Northern Fire Apparatus behind the job.

Sales Offices: Every Truck Dealer, Everywhere

"We furnish everything but the chassis"

Northern Fire Apparatus Co.

2420 University Ave., S. E. **Minneapolis, Minn.**

Lockport Board Promotes Office Building

LOCKPORT, N. Y.—A little more than a year ago at one of the membership get-togethers of the Board of Commerce, on the matter of erecting a building to cover the site occupied at that time by ruins left because of the broadening and deepening of the State Barge Canal, it was suggested that it might be a splendid piece of work for the Board of Commerce to endeavor to cover this site with a modern store and office building to be the home of the Board of Commerce. This appealed greatly to the membership, because of the fact that these ruins occupied one of the most conspicuous and prominent places on our Main Street, and a committtee was immediately appointed to investigate the possibilities and to report. As a result of the report of the committee an organization was incorporated and a campaign launched for the selling of stock, which has resulted in the directors of the corporation proceeding to build, and the building is now under construction.

WHERE WAS FORMERLY A LOCAL EYESORE THE LOCKPORT, N. Y., BOARD HAS BUILT ITSELF AN ATTRACTIVE HOME

The building is to be a two-story structure with six storerooms on the main floor and offices on the second, and is to be known as the Board of Commerce Building. The novel feature of the building is that the basement is to be utilized also as storerooms. Because of the fact that it overlooks the locks of the State Barge Canal, the stairway and sidewalk are being run from the street completely around the back of the building, forming a terrace overlooking the canal. The fact that there is a street on the opposite side of the canal gives wonderful promise to these basement storerooms, and virtually affords us a three-story structure. Construction is to be of reinforced cement, stone, and brick, and will be a tremendous improvement to our Main Street. The building when completed will cost approximately $80,000, the greater part of which has been subscribed by local citizens, who have responded to the appeal of civic pride.

This project has met with such great success, and the directors of the corporation are so much encouraged, that they are now beginning to look around to see what they can next undertake in the way of civic development and improvement.

D. HODSON LEWIS,
Secretary, Board of Commerce.

On the Calendar of Conventions

JANUARY 17-20.—CHICAGO, ILL.
American Road Builders' Association. Annual convention. Secretary, E. L. Powers, Editor *Good Roads*, 11 Waverly Place, New York, N. Y.

JANUARY 18-20.—NEW YORK, N. Y.
American Society of Civil Engineers. Annual meeting. Secretary, Charles Warren Hunt, 33 West 39th Street, New York, N. Y.

JANUARY 20.—TRENTON, N. J.
New Jersey State League of Municipalities. Annual meeting. Secretary, Clinton J. Swartz, 712 American Mechanic Bldg., Trenton, N. J.

FEBRUARY 16-18.—ALTOONA, PA.
Pennsylvania Commercial Secretaries Association. Semi-annual convention. Secretary-Treasurer, B. W. Grills, Secretary, Chamber of Commerce, McKeesport, Pa.

MAY 15-19.—PHILADELPHIA, PA.
American Water Works Association. Annual convention. Secretary, J. M. Diven, 153 West 71st Street, New York, N. Y.

MAY 9-11.—ATLANTIC CITY, N. J.
National Fire Protection Association. Annual meeting. Secretary, Franklin H. Wentworth, 87 Milk Street, Boston, Mass.

State Trunk Line No. 13 in Kilbourn, Wisconsin. Maintained with annual treatments of "Tarvia-B" since 1916

Good Roads that Grow Better—

MOST people are satisfied when the roads stay "as good as new." But not so the Road and Bridge Committee of Columbia County, Wisconsin.

They build good roads to start with and then, by far-sighted but inexpensive maintenance with "Tarvia-B," make those good roads better every year.

This extract from their letter will be of interest to all highway officials:

"Our experience in successfully maintaining our macadam roads with "Tarvia-B" is due not only to the excellence of your product, but also the rule we follow in Columbia County of surface treating macadam roads in good condition and giving them additional treatments of Tarvia annually.

"During the past couple of years, we have used clean limestone screenings ¾" size as a covering after applying the Tarvia. We believe we are adding just a little more Tarvia surface each year than the traffic wears off, as we have several macadam roads in this county that have been annually treated with "Tarvia-B" for the past six years and are in better condition at the present time than they were when first treated with Tarvia."

The use of Tarvia re-enforces the road surface and makes it waterproof, frostproof, mudless, dustless and automobile-proof. A road maintained with Tarvia pays for itself over and over again.

Tarvia is a coal tar preparation, made in a number of grades to meet construction, maintenance and repair problems.

Illustrated booklet describing the various Tarvia treatments free on request.

Tarvia
For Road Construction
Repair and Maintenance

GOOD ROADS SHOW

Visit our booth at the Coliseum, Chicago, Ill., during the Good Roads Show of the A. R. B. A.,
January 16-20, 1922.

New York, Chicago, Philadelphia, Boston, Cleveland, Cincinnati, Pittsburgh, Elwood, New Orleans, Birmingham, Kansas City, Minneapolis, Nashville, Syracuse, Salt Lake City, Seattle, Peoria, Atlanta, Duluth, Bangor, Washington, Johnstown, Lebanon, Youngstown, Toledo, Columbus, Richmond, Latrobe, Bethlehem, Elizabeth, Buffalo, Bahimore, Omaha, Jacksonville, Houston, Denver,

The Barrett Company

THE BARRETT COMPANY, Limited: Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S.

The Selection of Superheaters for Municipal Power-Plants*

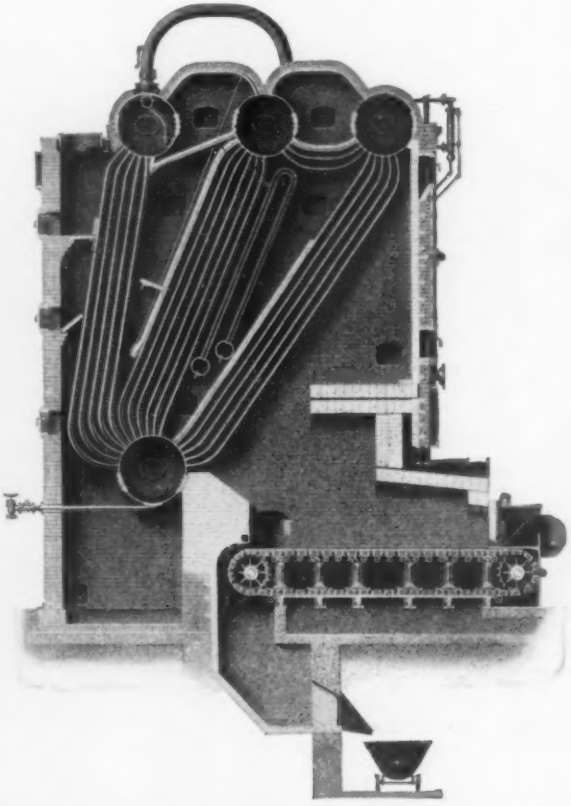
By W. F. Schaphorst, M. E.

THE natural temperature of steam at atmospheric pressure is 212° F. Pass this steam through a superheater and increase its temperature to 312° F., without increasing its pressure, and you have steam of 100° superheat. Similarly, the natural temperature of steam at 200 pounds absolute pressure is 381.9° F. Pass this steam through a superheater and increase its temperature to 481.9°, without increasing its pressure, and you have steam of 100° superheat. The function of the superheater, therefore, is simply to increase steam temperature—not to increase pressure.

Reference has been made in previous articles of this series to the advantages of superheated steam. In all large modern steam power-plants superheated steam is invariably specified. With superheated steam, higher efficiencies and economies are obtainable because efficiciency is dependent upon "temperature difference" in the same way that the efficiency and power of a hydraulic turbine are dependent upon the difference in water level.

Not only does superheated steam increase the efficiency of engines and turbines, but the efficiency of boilers equipped with superheaters is slightly increased. In European countries it is common practice to guarantee an increase in boiler efficiency of from 1 to 1½ per cent, although such a slight increase would be difficult to prove.

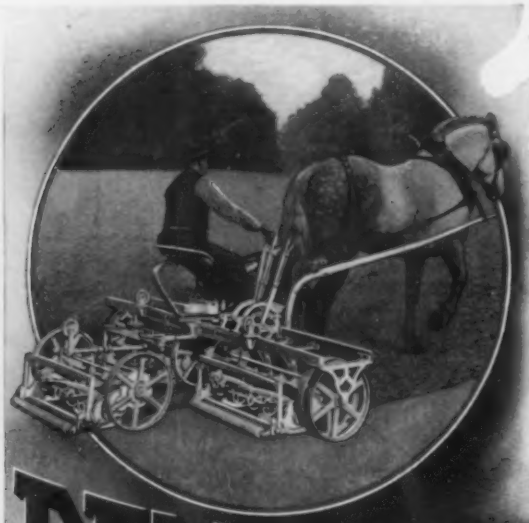
Superheaters are usually placed somewhere within the boiler setting, integral with the boiler, in order that the hot flue gases may do the superheating. The superheater is never placed directly in the furnace of the boiler itself, because in that location it could not withstand the heat; in all probability it would melt. Nor is the superheater placed at the "exit" of the gases, because at that point the gases are comparatively cool—so cool that they would not superheat the steam to a sufficiently high temperature. Consequently, it is common practice to-day to divide the boiler into "decks," placing the superheater between



RECLASSIFIED STIRLING BOILER WITH BABCOCK AND WILCOX STEAM SUPERHEATER AND BLAST TYPE CHAIN GRATE STOKER

* Copyright, 1921, by W. F. Schaphorst.

"PENNSYLVANIA TRIO"

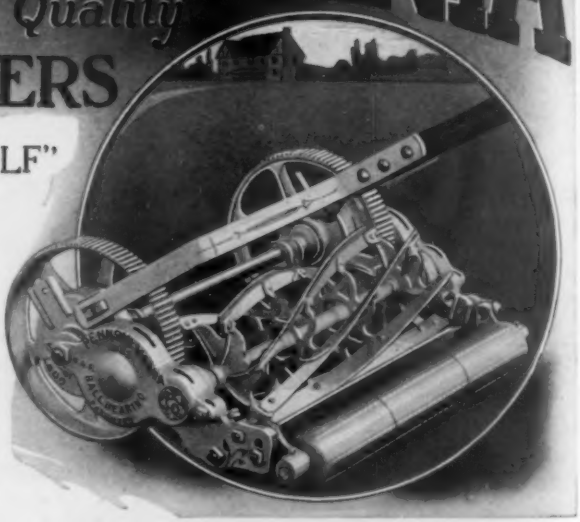


THE "PENNSYLVANIA TRIO" is the triumph of the famous Pennsylvania *Quality* Line. It embodies all the exclusive quality features. No other mower will cut grass on golf courses, big estates or parks as efficiently, economically or speedily.

PENNSYLVANIA *Quality* LAWN MOWERS

"PENNSYLVANIA GOLF"

The "Pennsylvania Golf" has no rival when close cutting is required on tennis courts, putting-greens and lawns. It trims to $\frac{3}{16}$ of an inch. All its blades are crucible tool steel; self-sharpening.



Write for "Pennsylvania Book"

PENNSYLVANIA LAWN MOWER WORKS, Inc.
1615 North 23rd Street, Philadelphia, Pa.

the decks at a point where the temperature of the gases for heating the superheater will be suitable.

The selection of the right kind of superheater depends largely upon the load conditions in the plant. If the load is comparatively steady, a superheater of the above type would do very well, but if the load fluctuates violently, being below normal at one time and 100 to 200 per cent above normal at another time, it is evident that the superheater would also fluctuate considerably and a different type of superheater should be selected. Superheated steam of a constant temperature is always most desirable.

There is on the market a type of superheater equipped with an automatic temperature control that by-passes the hot flue gases in such a way that fairly constant superheat is maintained. At the same time, if the boiler is equipped with an economizer, the heat in the hot gases is not wasted. If the boiler is not equipped with an economizer, it is better to waste the flue gases than to melt or burn the superheater with the excessively high temperature gases.

The above types of superheaters are made integral with the boiler. Where load conditions vary suddenly, or widely, or where the prime movers are located at a considerable distance from the boilers, a "separately fired superheater" located on the main steam line may be the correct solution. To be sure, separately fired superheaters are less efficient than the integral type and are not so much used. The integral type is always preferable wherever it can be installed. Superheaters that are separately fired should be automatically regulated or carefully watched so that in case of a sudden drop in steam consumption the superheat will not run too high and the superheater will not be ruined.

Necessary Cautions

It must be remembered that, although beneficial as regards steam consumption, superheated steam also has its upper limitations. If allowed to get too hot, superheated steam will ruin brass and other alloy fittings and may have a retarding effect upon the lubrication of steam engines. Turbines, engines, and fittings are usually made of different kinds of metals, joined together. Each metal usually has a coefficient of expansion of its own, different from those of the other metals, and thereon, also, hinges another trouble.

In selecting a superheater, bear in mind the fact that placing it within the boiler setting is liable to increase the frictional resistance of the gases through the boiler. Be sure that this resistance is not increased too much. The superheater should be so placed that it will have ample space in which to expand and contract, independently from the boiler, boiler parts, and setting. See that the superheater is equipped with an independent safety-valve of the outside-spring type. This safety-valve should be set slightly lower than the safety-valve on the boiler, so that in case of too high pressure the superheater valve will let go first and there will always be a flow of steam through the superheater. Otherwise, if the boiler safety-valve lifted first, the flow of steam through the superheater might cease and the superheater might be ruined by burning. Also be sure that the superheater is equipped with drains for removing water from all portions before starting up. Unless the superheater is thoroughly drained, slugs of water may be carried along with the steam to the prime movers, with results that might prove disastrous.

Users of superheaters should be careful about permitting saturated steam connections to the boiler in addition to the superheater connection, especially to the prime movers. This is bad practice, because the use of saturated steam reduces the amount of superheated steam, the velocity of superheated steam is reduced correspondingly, and as a result there might not be sufficient flow through the superheater for its own protection against distortion or burning. Saturated steam connections should never be permitted to carry more than 10 to 15 per cent of the entire amount of steam generated by the boiler.

Despite the great amount of study that has been given superheaters and despite the broad experience that has been had with them, it is practically impossible to predict with accuracy the performance of a superheater under varying conditions. With a given coal, a mechanical stoker may give a lower degree of superheat than would hand-firing with the same coal. It is reported that in one plant, which was converted to burning oil from previous mechanical stoking, the superheat was reduced 36 per cent

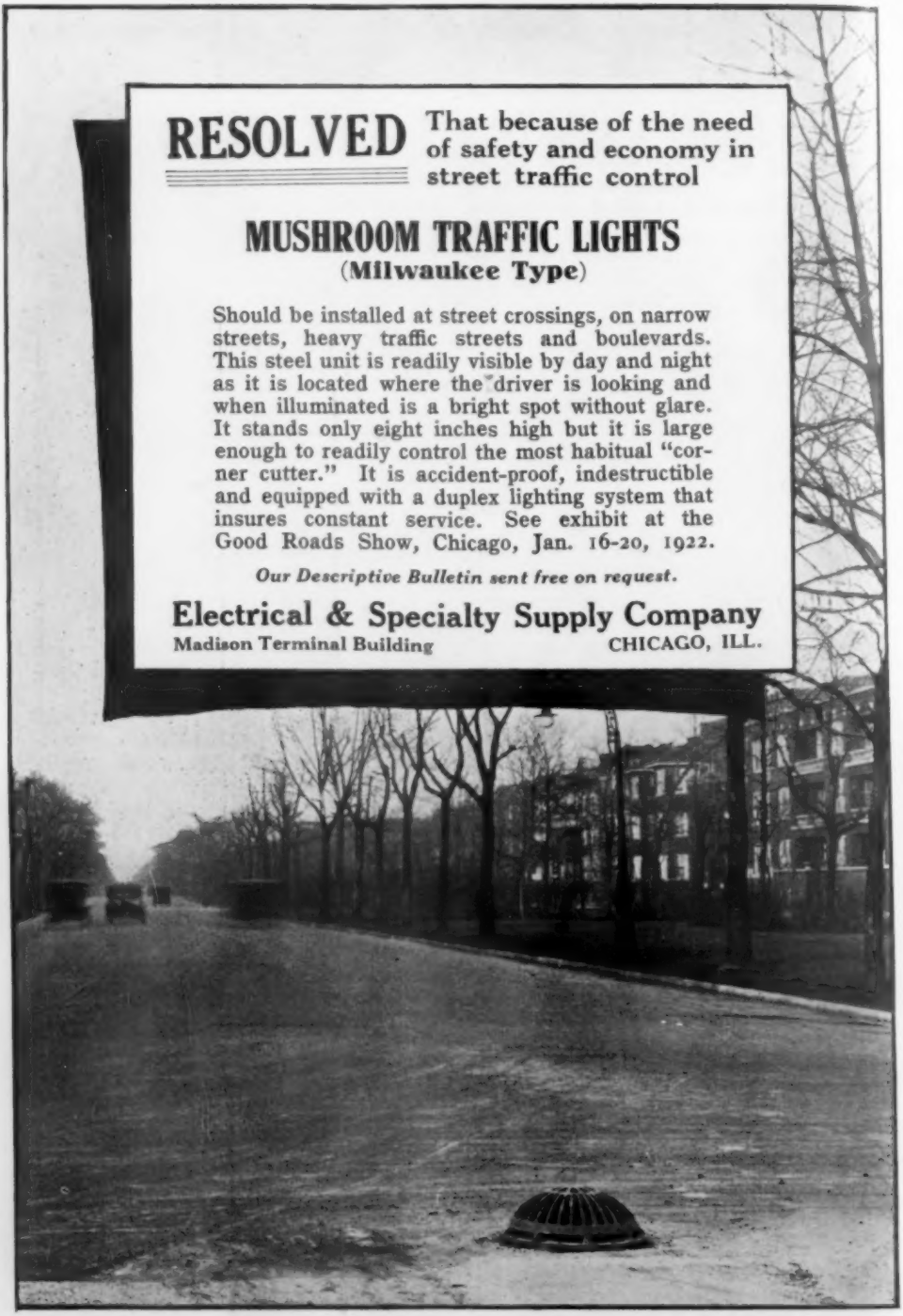
RESOLVED That because of the need of safety and economy in street traffic control

MUSHROOM TRAFFIC LIGHTS
(Milwaukee Type)

Should be installed at street crossings, on narrow streets, heavy traffic streets and boulevards. This steel unit is readily visible by day and night as it is located where the driver is looking and when illuminated is a bright spot without glare. It stands only eight inches high but it is large enough to readily control the most habitual "corner cutter." It is accident-proof, indestructible and equipped with a duplex lighting system that insures constant service. See exhibit at the Good Roads Show, Chicago, Jan. 16-20, 1922.

Our Descriptive Bulletin sent free on request.

Electrical & Specialty Supply Company
Madison Terminal Building CHICAGO, ILL.



at normal load; reduced 40 per cent at 50 per cent overload; and reduced 42 per cent at 100 and 150 per cent overloads respectively. It is evident, therefore, that the fuel and method of firing have much to do with the degree of superheat obtainable. Other factors that affect the degree of superheat are: amount of excess air used in combustion; heating value of coal burned, as well as kind of coal; type of stoker used; and quality of manual attendance.

In view of these facts, therefore, the municipal power-plant official must not be surprised if, after purchasing and installing a superheater, it fails to give the exact degree of superheat desired—unless it is of the type equipped with by-passes and automatic temperature control. The writer knows that some of the largest manufacturers of superheaters are still having their troubles. In spite of these troubles, however, superheaters are to be recommended as important economy factors in all modern municipal steam power-plants.

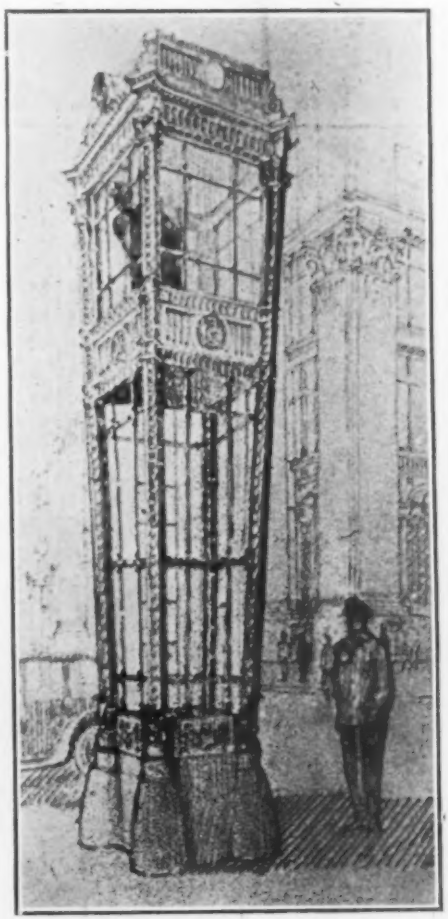
New York's Traffic Towers

MUNICIPAL officials throughout the country, especially those directly interested in traffic control, are familiar with the story of New York's traffic towers. The five now in use were installed along Fifth Avenue by Dr. John A. Harris, Special Deputy Police Commissioner, at his own expense, and were originally in the nature of an experiment. They have worked out so satisfactorily that their permanent retention has been decided on.

The Fifth Avenue Association offered a prize for the design of a bronze traffic tower, more ornamental than the simple, temporary structures originally erected. The prize was won by Joseph H. Freedlander, who will be retained as architect to supervise the construction of the new towers. The contest aroused much interest among architects throughout the country. The Association's announcement says:

"The new signal towers are to be constructed almost entirely of bronze, with a granite base 4 feet square and 3 feet high. They will be 23 feet in height. The base is to have granite 'striking blocks' at each corner to fend off traffic and to protect the tower itself. The lower part of the structure will be open so as to allow an unobstructed view up and down the avenue. The space at the top which is to house the traffic policemen will be enclosed in glass windows, so operated as to allow the policeman in the tower to open or close all of them at one time with a single swing of a lever. The towers will be heated by means of electric stove."

Besides the $500 first prize, second and third prizes of $300 and $200 were offered. Dr. John H. Finley, former Commissioner of Education of the State of New York, made the address at the banquet at which the prizes were awarded.



THE WINNING DESIGN FOR NEW YORK'S TRAFFIC TOWERS

Lowering the Cost of Greater Police Efficiency

MEMPHIS, TENNESSEE. One of the best police departments in the South. Motorcycles? Decidedly. Harley-Davidsons? Exclusively!

Memphis is one of the hundreds of American cities (large and small) that have increased police efficiency and lowered its expense by using Harley-Davidsons. A policeman on a motorcycle can do so much more—and in so much less time—that the moderate first cost of the machine is soon earned. Thereafter the motorcycle pays the city a profit every month for years.

In any emergency—in any weather—on any road, the greater dependability, durability and economy of the Harley-Davidson have won for it the distinction of being "America's Police Motorcycle"—used exclusively by most all *modern* police departments.

Police Dept. uses of Harley-Davidsons

Chasing speeders
Running down "motorized crooks"
Enforcing parking rules
Regulating traffic
Messenger work
Emergency calls
Bringing relief or reinforcements

Ask your local dealer for free demonstration and the new, reduced Harley-Davidson prices (25% lower). Or write to us for interesting book, illustrating motorcycles in use by many police departments.

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE WISCONSIN

Harley-Davidson
World's Champion Motorcycle

Municipal Finance

BONDING ACCOUNTING TAXATION

Own Your Own City

Two Canadian Cities Try an Interesting Experiment in Finance

THE city of Brantford, Ontario, Canada, recently completed the marketing of $550,000 city bonds "over the counter." The treasurer, Arthur K. Bunnell, believed that, after its experience with the war loans, the public was prepared for such an experiment, provided the proper atmosphere was created. He therefore called into consultation all the bond brokers doing business in the city, and with them arranged a joint newspaper advertising campaign, calling attention to the soundness of the investment, the satisfactory rate of interest, 6 per cent, and to the fact that it was a matter of good citizenship to provide funds for the needs of the municipality. The brokers were allowed a commission of one-half of 1 per cent on their sales.

The bonds were issued in denominations of $100 and up, with interest payable half-yearly. The population of the city is only a little over 33,000, but the bonds were readily absorbed. The distribution was very broad, embracing all classes of the community, and as a natural consequence has considerably stimulated civic interest. The experiment was a complete success, and it is believed that the future requirements of the city for any reasonable amounts can be cared for by the local investing public.

A similar experiment, reported by Leslie Andrew, City Commissioner, was tried in the city of Saskatoon, Saskatchewan, recently, when debentures of the city to the amount of $100,000 were sold to the citizens over the counter.

Saskatoon has an estimated population of 30,000. It is the distributing point for a vast farming district, being situated on three lines of railway, each of which has a number of branches radiating into the surrounding territory. The district this year had one of the best crops in its history and is therefore enjoying a liberal measure of prosperity.

Finding it necessary to raise $100,000 by the sale of debentures, and realizing that the time was inopportune to approach the money market in the usual way, the City Council, on the recommendation of the Commissioner, decided to offer the debentures locally through the City Treasurer's office. Publicity was given to the Council's decision, and immediately there was a brisk demand for the bonds, with the result that they were quickly disposed of.

The bonds were sold at a price to yield the investors 7 per cent interest. They were of the sinking fund variety, $76,000 being issued for a term of 5 years and the balance of $24,000 running for 10 years. The denominations issued were $100, $500, and $1,000. It was found after the issue had been fully taken up that $67,000 had been subscribed for in denominations of $1,000, $20,000 in $500, and the balance in $100 denominations.

The bonds were not printed until the sale had been completed, thus giving purchasers the greatest possible latitude in the amount they desired to purchase. As subscriptions came in, the City Treasurer issued interim certificates, these being turned in again when the definitive bonds were ready for delivery to the purchasers.

Part of the success which attended the floating of the local debenture issue in Saskatoon must be attributed to the education of the people as to the value of bonds from a savings investment standpoint through the various loans floated in recent years by the Dominion Government to defray war expenses. It must not be overlooked that an attractive rate of interest was offered to the investors, which, apart from any question of patriotism, was a considerable factor in the success of the issue.

Indian Scout

The Universal Motorcycle

Here's a messenger boy 16 years old.

His mother bought him an

Indian Scout

because it was not heavy, it was not noisy, it was clean, mechanically simple, easy to handle and economical to operate. She knew her son could use a Scout profitably and without danger.

Here's a Motor Cop.

The city bought him an

Indian Scout

because in addition to recognizing the essential features which influenced the mother's purchase they realized that the Scout was strong, reliable and sufficiently speedy and powerful to answer every requirement of their mounted policemen.

LIGHT ENOUGH FOR THE MESSENGER BOY
STRONG ENOUGH FOR THE MOTOR COP

That's Why

The Indian Scout is the Most Popular Motorcycle in the World

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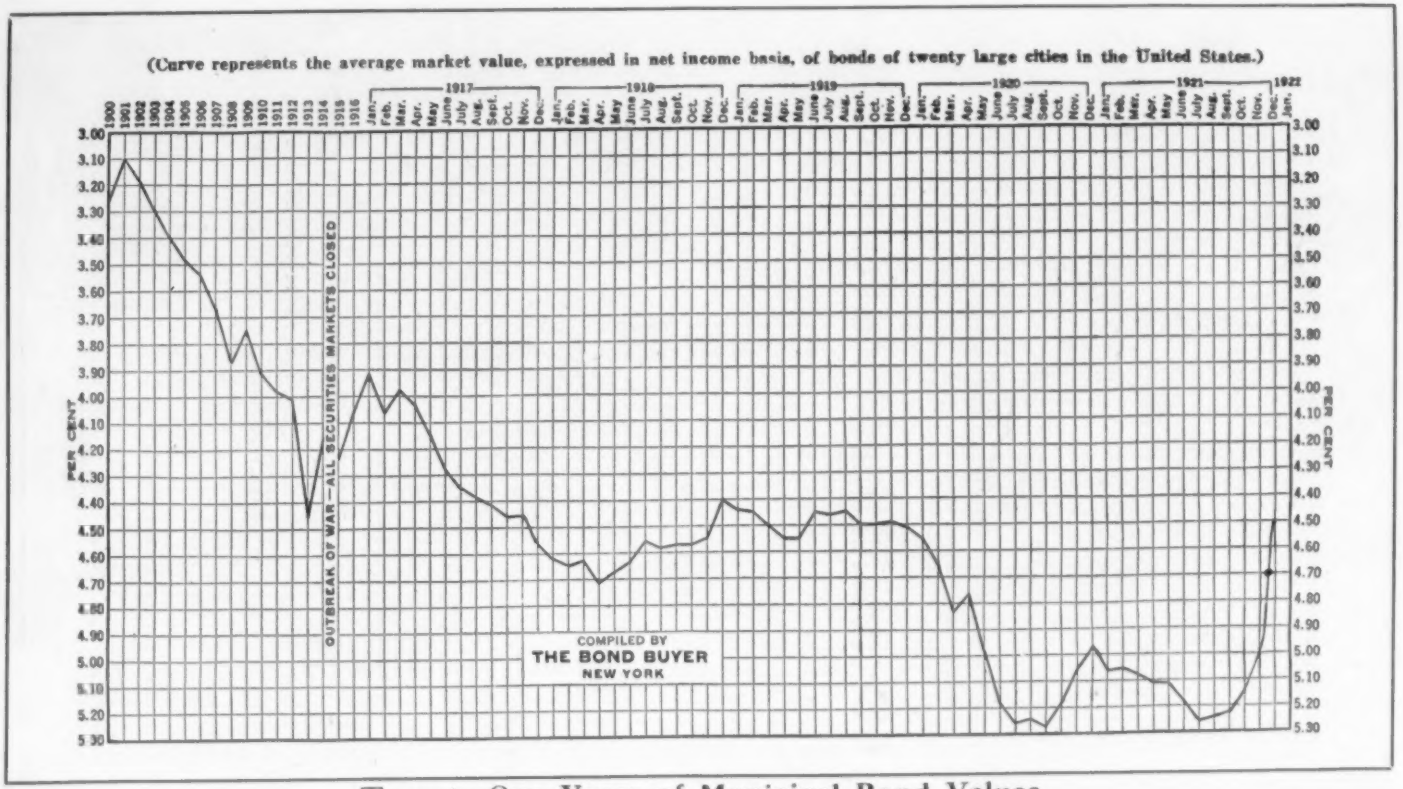
HENDEE MANUFACTURING CO.

Municipal Dept.
Springfield, Mass.


(Curve represents the average market value, expressed in net income basis, of bonds of twenty large cities in the United States.)
1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916
1917
1918
1919
1920
1921
1922
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80 3.90 4.00 4.10 4.20 4.30 4.40 4.50 4.60 4.70 4.80 4.90 5.00 5.10 5.20 5.30
PER CENT
OUTBREAK OF WAR—ALL SECURITIES MARKETS CLOSED
COMPILED BY
THE BOND BUYER
NEW YORK

Twenty-One Years of Municipal Bond Values

This graphic history of the trend of the municipal bond market is of great value to every municipality considering the issuance of bonds in the near future. As THE AMERICAN CITY goes to press, the figures for December, 1921, are not available; it may be safely predicted that they will carry the graphic line higher. It will be noted that the municipal bond market is well advanced on the road to "normalcy." See page 77 for analysis.

At Last! A Successful Snow Plow For The Fordson

The Wehr Company introduce the Wehr Highway and Street snow plow for the Fordson Tractor, after exhaustive tests and experiments. It is a proven and effective snow plow, which opens new sales possibilities for every Fordson dealer in the Northern States.

It affords the county the cheapest and most economical equipment for keeping the highway open, even during the severest blizzard.

It is the only Snow Plow on the market on which the side-draft can be controlled by the tractor, as the tractor pivots over a heavy push bar, so a straight line of draft on the tractor can be maintained at all times. The draft is taken from the tractor draw bar.

It is the only Snow Plow which will take a cut with half of the blade, and maintain a straight course. This is important when cutting through drifts.

The Fordson Tractor can handle this Snow Plow on high speed over ordinary grades encountered on cement highways or City streets, maintaining a speed of eight to ten miles per hour.

The Wehr Snow Plow will handle icy conditions, keeping gutters clean and ruts out of roads, making a smooth road for automobile travel.

Liberal Discount to Dealers.

SPECIFICATIONS—

The Wehr Snow Plow has a ten foot blade, set at an angle of forty-five degrees, cutting eight feet. The blade can be raised or lowered at either end.

It is equipped with worm-gear Steering Control.

Weight two thousand pounds (2000) —weight of plow is carried on four runners.

Plow can be equipped with auxiliary wheels, which can be lowered when going over bare spots.

The Snow Plow is attached to tractor with one bolt.

Wehr Company

549 Thirtieth Street

MILWAUKEE WISCONSIN

Municipal Bond News

THE graph of the municipal bond market compiled by *The Bond Buyer* and shown on page 75 is of great interest to followers of the municipal bond market. It illustrates clearly the major movements of the municipal bond market, in terms of yield, rather than in terms of price, which form the basis of most graphic charts. For this reason it will appear at first glance to be inverted.

The Effects of the War

First of all, it shows how difficult it would be to determine an exact "normal" rate for municipal bonds. In the years between 1901 and 1913 we find the cost of money to municipalities steadily rising, over a total fluctuation of 1.30 per cent. Then came a partial recovery, which culminated with the approach of our entrance into the war. With the actual declaration, the cost of money began a rising movement lasting about a year, when rates became stabilized in the 4.40 to 4.70 zone. This may be explained by reference to the direct influence of the Government on money rates, necessitated by the flotation of the Liberty and Victory issues. The value of the tax exemption features of municipals is also emphasized in this period, as it saved the bonds of municipalities from the full force of competition with the more speculative industrial securities, which during this period yielded very much higher returns, subject, of course, in the case of large investors, to very high taxes.

The Period of Deflation

With the month of November, 1919, begins another pronounced curve. This may be said to have terminated in July of 1921, and is the history of "deflation" expressed in terms of municipal bonds. It was a period of "tight money," during which large quantities of high-coupon bonds of industries, as well as of foreign governments, were offered to investors. Without going into a discussion of the economic merits or demerits of tax exemption of municipal securities, it may be safely stated that the tax exemption feature held down the rate on municipal securities rather effectively. The graph shows that the average net income of bonds of twenty large cities of the United States did not quite reach the 5.30 per cent level, while at the same time a yield of 7 and 8 per cent was common in taxable corporate and foreign securities of very high investment rating, and a return of above 5.30 could be found in certain issues of the Federal Government itself.

The Recovery of the Bond Market

The municipal bond market began to give convincing evidence of its strength with the short-lived recovery commencing in September, 1920, checked after a few weeks and gradually forced down. Possibly this was due to the very heavy offerings of municipal bonds which have marked the year 1921. The table which appeared on page 431 of the November AMERICAN CITY showed the record-breaking volume of these issues.

In July, 1921, began another recovery, gradual at first, but gaining momentum, until in the single month of November the averages rose one-half of one per cent, in a perpendicular movement such as the market had not seen in this generation. At present this movement still continues with great vigor. The first of December saw the averages established in what may be called the "war zone," and probably the first of January found the average at nearly pre-war levels.

Bond Issues of the Month

Among the municipal bond offerings of December which have aroused especial interest may be mentioned the issues of Rochester, Buffalo, and New York. The Rochester bonds were brought out early in the month on a 4½ per cent basis, and the offering is regarded as one of the most successful of the year. The Buffalo and New York bonds appeared the following week. The Buffalo issue totaled $7,360,000, of which $6,000,000 were school bonds. The bonds mature in from one to twenty years, carry a 4½ per cent coupon, and have found a ready market at prices to yield 4.20 to 4.05, according to the date of maturity.

The same day New York brought out $55,000,000 of corporate stock. This, too, bears a 4½ per cent coupon, runs 50 years, and has been sold on a 4¼ per cent basis. For these bonds the syndicate bid 103.407, and the issue is currently traded in, on a when-issued basis, at about 104½. It is stated that one must go back to 1909 to find an issue placed on better terms, as far as New York is concerned.

Cletrac Keeps The Roads Open

THE picture shows the crawler type Cletrac fighting the deep snow on the Schenectady-Albany turnpike last winter. On a four mile stretch of this road the drifts were so high in places that the Cletrac often had to cut back and forth three or four times, but it stayed right with it and opened the road for traffic in three hours time.

Municipalities in all parts of the country keep Cletracs on hand to insure themselves against traffic tie-ups in winter. New York City alone has 100 for this purpose. And in the summer of course, they are used for street cleaning and maintenance and all kinds of heavy haulage jobs.

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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

City May Regulate But Not Prohibit Hospitals for Contagious Diseases

An ordinance prohibiting maintenance anywhere in the city of any hospital for treatment of contagious or infectious diseases, is wholly unreasonable, and so not justified as an exercise of the police power. And enforcement of such an ordinance will be enjoined. These two propositions were decided by the California Supreme Court in the case of San Diego Tuberculosis Association v. City of East San Diego, 200 Pacific Reporter, 393.

Plaintiff successfully sued to enjoin enforcement of an ordinance of defendant city, which declared every hospital for the treatment of persons afflicted with contagious or infectious diseases to be a nuisance, making the maintenance of any such hospital within the limits of the city a misdemeanor, and making its maintenance a separate offense for each day. A series of prosecutions was commenced against plaintiff's officers and employees and its continuation was threatened. Upholding plaintiff's right to an injunction, the Supreme Court says:

"Two questions are presented: first, is the ordinance invalid? and, second, even if it is, can its enforcement by the city officials be enjoined? The answer to both of these questions seems to us plain.

"The ordinance can be justified only as an exercise of the city's police power. This power, is of course, very broad, but it is not without limitation. One limitation enforced in numerous cases is that an ordinance purporting to be an exercise of the city's police power 'may not be arbitrary or unreasonable. The exercise of the police power cannot be made a mere cloak for the arbitrary interference with or suppression of a lawful business.'

"Such being the law, was the present ordinance a reasonable one in its essential feature, that of prohibiting within the city any hospital for the treatment of contagious or infectious diseases? Such prohibition is very different from regulation, and can be justified only on the ground that such a hospital, no matter how well conducted, is a menace to the public peace, morals, health, or comfort. That a well-conducted, modern hospital, even one for the treatment of contagious and infectious diseases, is not such a menace, but, on the contrary, one of the most beneficent of institutions, needs no argument. There is not the slightest danger of the spread of disease from it, and this is the only possible ground on which objection could be made to it. We have no hesitation in holding an ordinance prohibiting the maintenance anywhere within the city of an institution so necessary in our modern life and so beneficent to be wholly unreasonable and invalid. . . .

"As to the second question, the enjoining of the enforcement of the ordinance, the rule is thus stated in Abbey Land Co. v. San Mateo, just referred to, 167 Cal. on page 440, 139 Pac. on page 1070, 52 L. R. A. (N. S.) 408, Ann. Cas. 1915C, 804:

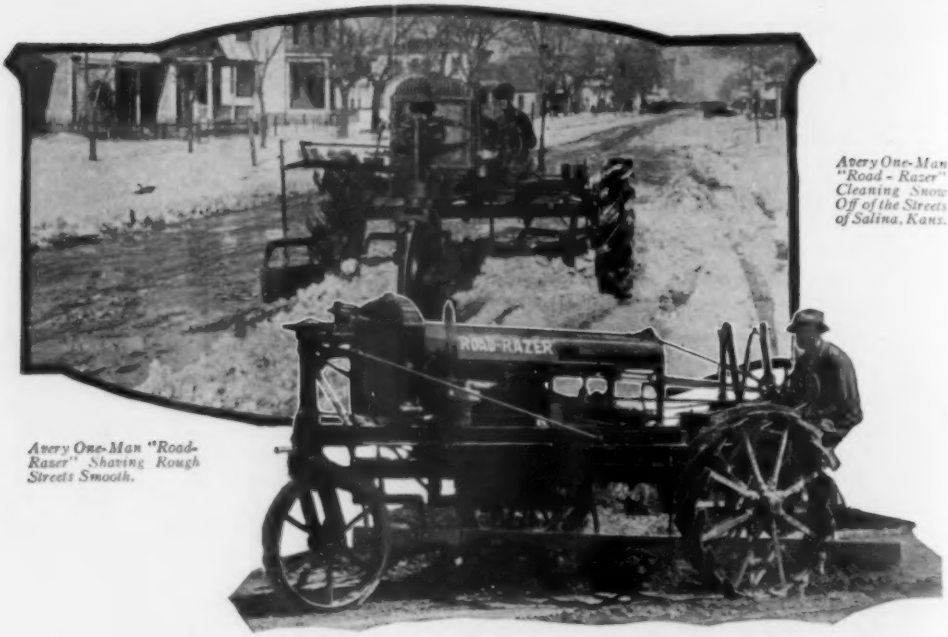
"The doctrine that an action will lie to enjoin the enforcement of an (invalid) municipal ordinance in cases where such enforcement will cause substantial and irreparable injury to private property or private property rights, and in which there is no adequate remedy in the ordinary course of law, is now too well settled to require discussion. . . .

"It is evident in the present case that the enforcement of the ordinance would cause substantial and irreparable injury to the plaintiff's property, and that against the threat of its enforcement by the repeated prosecutions which the ordinance permits the plaintiff has no adequate remedy. The case, therefore, comes within the rule stated in Abbey Land Co. v. San Mateo, and upon the facts alleged in the complaint the plaintiff was entitled to have the enforcement of the ordinance enjoined."

An Order Requiring Relocation of Street Railway Tracks Is Void in the Absence of Public Need

A decision of the Connecticut Supreme Court of Errors is an important addition to the body of judicial law affecting the right of cities and public service commissions to require public utilities to reconstruct their facilities situated in public places.

In the case passed upon (Connecticut Co. vs. Town of Stamford, 110 Atlantic Reporter, 554) it appears that for more than a mile along Hope Street in Stamford the street railway company's track is at one side, rather than in the center, of the street. The selectmen of the town ordered reloca-



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tion of the track along the center of the street, and the order was affirmed on successive appeals to the Public Utilities Commission and the Superior Court of the county in which Stamford is situated. On further appeal, however, to the Supreme Court of Errors it is decided that the order is void for failure to show that the public safety or other public necessity requires the relocation. At the same time the Supreme Court recognizes the existence of broad powers in the public authorities to require public utilities to conform their affairs to public needs. But the circumstance that it would entail an expense of $28,113 to relocate appellant's track is regarded as calling for a showing of some specific necessity for the relocation against its protest. Salient parts of the Supreme Court's opinion read:

"The maintenance and regulation of highways is within the police power of the state. The state may by itself or its agent decide what public improvement the public safety, health, or welfare demands.

"The power to legislate for the safety, health, or welfare of its people is inherent in the state in virtue of its sovereignty. All property is held subject to this power. . . . And all property, too, is held upon the implied promise of its owner or user that it shall not be used against the public welfare.

"The Connecticut Company accepted its charter and operated this railway line subject to the power of the state or its agent, the town, to so regulate its use that it might not do injury to the public welfare.

"When the conditions and locality change and the public welfare requires it, the street railway may be compelled to change its grade, or location, or the manner of its use of the highway. . . .

"The protection of the public safety, health, or morals by the exercise of the police power is not within the inhibitions of the constitution; and, since all property is held subject to such regulation, there is no obligation upon the state to indemnify the owner of the property from the damage done him by the legitimate exercise of the police power. Property so damaged is not taken; its use is regulated in order to promote the public welfare. . . .

"The police power, like every other power of government, is within constitutional limitations.

"Laws enacted presumptively for the public welfare, but in fact not, cannot be sustained as an authorized exercise of the police power. . . . And an act regulatory of this power which is oppressive, or unreasonable, is not a legitimate exercise of the power. . . .

"The railroad track laid in a public street, though by express public grant, is subject to such regulations as are reasonably necessary to secure the public safety; for this power 'is inalienable even by express grant.' . . .

"Provided the order of relocation was made in the interest of public safety and was reasonable in the circumstances, the order was a valid order, even though no provision was made for indemnifying the railway company for the cost of relocation."

The opinion then proceeds to a conclusion that the order appealed from was invalid for omission of any showing that the present location of the track is dangerous to the public on the highway or to passengers on the cars, and failure to present the facts supporting a conclusion of the trial court that the relocation "would be distinctly proper and expedient and highly conducive to the safety of all concerned," etc.

Personal Interest of Official May Invalidate Municipal Contest

That a municipal official participating in an award of a contract for public work to a construction company is a salaried officer of that company gives him such interest in the transaction as will justify a reletting of the contract, on discovery of his relationship to the company, holds the Wisconsin Supreme Court in the case of Edward F. Gillen Co. v. City of Milwaukee, 183 Northwestern Reporter, 679. It is also held that the disqualification of the company is not removed by the official's resigning his position with the company after award of the contract.

The Court justifies defendant city's sewerage commission in rescinding a contract for construction of a sewage disposal plant on discovery that one of the commissioners who voted to award the contract was employed by the contracting company at an annual salary of $4,500 as superintendent. But it is intimated that the mere fact that a municipal officer may be employed by a contractor will not vitiate a contract where there is no real conflict of interests.

Holding that another commissioner was not disqualified to vote to award the contract to another company by reason of the fact that he formerly was a stockholder and officer of that company, nor because his son was interested in and an officer of the company, the Court adds that "the decisions are to the effect that contracts may be legally made by a municipality although a relative of the bidder is one of the governing board or council. In such case there is no direct or indirect interest in the contract."

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Charles Moore. Houghton Mifflin Company, Boston. 2 vols. Illustrated. 1921. X + 250, and 238 pp. $20.

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TAXATION OF FEDERAL, STATE AND MUNICIPAL BONDS

John H. Hoffman and David M. Wood, of the New York Bar. 1921. The Bond Buyer, New York. 130 pp. $5.

The subject is approached from the legal side, without economic considerations. The volume consists of two parts, the first being devoted to a discussion of the principles of the law of taxation as applied to the United States and its governmental subdivisions, state, colonial and municipal. Part two is an exhaustive analysis, in tabulated form, of the tax laws of the United States and each state and territory with reference to such bonds. The text is exhaustively annotated to afford complete reference to statutes and court decisions, wih a table of cases.

THE CONFLICT

Gertrude K. Colby, B.S., Department of Physical Education, Teachers College, Columbia University, with an introduction by Thomas D. Wood, A.M., M.D., Professor of Physical Education, Columbia University. A. S. Barnes and Company, New York. 1921. 70 pp. Illustrated. $1.50.

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THE CONFERENCE OF GOVERNORS

Proceedings of the Twelfth Conference of Governors of the States of the Union, held at Harrisburg, Pa., Dec. 1-3, 1920. Includes the Articles of Organization of the Conference, and papers in full. (Apply to M. C. Riley, Secretary, Governors' Conference, Madison, Wis.)

NEW YORK STATE INDUSTRIAL COMMISSION

Annual Report of the Industrial Commission, State of New York, Department of Labor, for the year ended June 30, 1920. Published as Legislative Document No. 88. (Apply to E. W. Buckley, Secretary, Industrial Commission, Department of Labor, Albany, N. Y.)

CHEAP MEALS FOR SCHOOL CAFETERIAS AND PUBLIC INSTITUTIONS

"Ten-Cent Meals." Bulletin of the American School of Home Economics, as No. 34, Series I. 10 cents. This pamphlet is part of the book "Low Cost Cooking," by Miss Florence Nesbit, Field Supervisor and Dietitian of the Department of Relief of the Juvenile Court of Chicago. The book will be found of value by individuals and organizations engaged in relief work, as well as by those in charge of school cafeterias and institutions. (Apply to The American School of Home Economics, 506 West 69th Street, Chicago, Ill.)

REGULATIONS FOR CENTRAL PURCHASING BY CITIES

Model System and Rules and Regulations for Central Purchasing by Cities. Data gathered by the New York State Bureau of Municipal Information. 7 pp. mimeographed. December, 1921. (Copies not available for general distribution; apply to William P. Capes, Secretary, New York State Conference of Mayors, 25 Washington Avenue, Albany, N. Y.)

A HALF CENTURY OF PUBLIC HEALTH

Edited by Mazyck P. Ravenel, M.D. American Public Health Association, New York. 1921. 461 pp.

An outstanding volume of facts, giving the history of public health in North America during the most intensive fifty years of public health work. An invaluable summary of activities in public health work, including bacteriology, mortality statistics, quarantine, the control of disease, water purification, sewage and refuse removal, industrial waste, food control, food conservation, milk, child welfare work, housing, ventilation, industrial hygiene, medical entomology, and public health nursing. The foremost experts, engineers and medical men in the different fields contributed the chapters of this valuable encyclopedia of public health activity.

THE MANAGEMENT OF MEN

Edward L. Munson, Colonel General Staff; Chief, Morale Branch, War Plans Divisions. Henry Holt and Company, New York. 1921. XIII + 799 pp. $6.

Although designed primarily to meet the problems involved in the management of soldiers, the principles enunciated are equally applicable to the successful handling of men in the daily affairs of civil life.

INTRODUCTION TO THE SCIENCE OF SOCIOLOGY

Robert E. Park and Ernest W. Burgess, of the Department of Sociology, University of Chicago. The University of Chicago Press, Chicago, Ill. 1921. XXI + 1,040 pp. $4.75, postpaid.

A collection of readings selected to define and illustrate the concepts and principles of sociology. It is designed for the first course in sociology and combines the features of a text-book and a reference library.

MIND TRAINING FOR CHILDREN

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LECTURES ON ENGINEERING PRACTICE

The J. E. Aldred Lectures on Engineering Practice. Edited by John B. Whitehead, Dean of the Faculty of Engineering, Johns Hopkins University. Published by The Johns Hopkins Press, Baltimore, Md. 1921. 285 pp. illustrated. A series of nine lectures on practical phases of engineering. Three lectures each are devoted to civil, mechanical and electrical engineering. (Apply to John B. Whitehead, Dean, Faculty of Engineering, Johns Hopkins University, Baltimore, Md.)

PUBLIC HEALTH NURSING

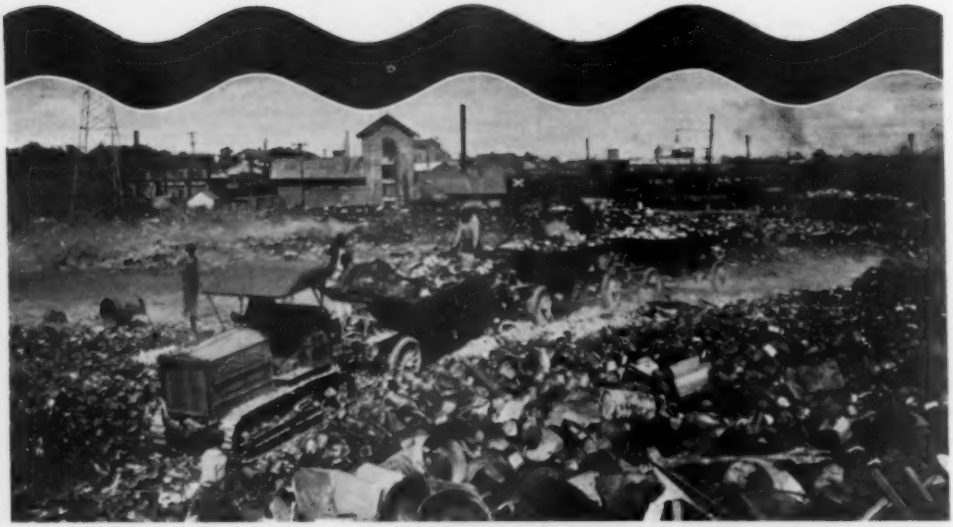
Manual for Public Health Nurses. Published by the New York State Department of Health, Hermann M. Biggs, M.D., Commissioner, 1920. 261 pp. Covers in convenient form all subjects in the field of public health nursing. (Apply to Hermann M. Biggs, Commissioner, New York State Department of Health, Albany, N. Y.)

PENOLOGY

Proceedings of the Annual Congress of the American Prison Association, at Columbus, O., October, 1920. 1921. 469 pp. $3. Proceedings of the Congress, with all papers in full. (Apply to O. F. Lewis, General Secretary, Central Office, American Prison Association, 135 East 15th Street, New York, N. Y.)

THE SINGLE TAX IN OPERATION

"Enclaves of Single Tax," by Fiske Warren, with a historical description by Charles White Huntington. 1921. 150 pp. Maps. 25 cents. A compendium of legal documents involved in the organization of the various single-tax colonies in the United States and Europe, and general descriptions of those communities. Among those described are Fairhope, Ala., Arden, Del., and Sant Jordi, Andorra. (Apply to Fiske Warren, Harvard, Mass.)



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When writing to Advertisers please mention THE AMERICAN CITY.

HEALTH OF SCHOOL CHILDREN

"A Preliminary Study of Standards of Growth in the Detroit Public Schools," by Paul C. Packer and Arthur B. Moehlman. 46 pp. Illustrated. 1921. This is the June number of "The Detroit Educational Bulletin," published by the Board of Education, Detroit, Mich. (Apply to Stuart A. Courtis, Director of Instruction, Teacher Training and Research, Detroit Public Schools, Detroit, Mich.)

NATIONAL CONFERENCE ON CITY PLANNING

Proceedings of the Thirteenth National Conference on City Planning, held in Pittsburgh, May 9-11, 1921. 1921. 206 pp. Full text of the papers presented to the Conference. $2.25. (Apply to Flavel Shurtleff, Secretary, National Conference on City Planning, 60 State Street, Boston, Mass.)

FIRE PREVENTION DAY IN PENNSYLVANIA

"Make Pennsylvania Fireproof." 11 pp. Illustrated. Suggestions for the observance of Fire Prevention Day. Issued by the Bureau of Fire Protection, Department of State Police, Harrisburg, Pa. (Apply to publishers.)

FIRE REPORT FOR IOWA

Tenth Annual Report of the State Fire Marshal for the year 1920. 32 pp. 1921. (Apply to J. A. Tracy, State Fire Marshal, Des Moines, Iowa.)

ILLINOIS FIREMEN'S ASSOCIATION

"Thirty-third Annual Convention of Illinois Firemen's Association." 176 pp. Illustrated. 1921. (Apply to Roy Alsip, Secretary, Illinois Firemen's Association, Champaign, Ill.)

DETROIT PARKS

"Detroit, Its Parks and Recreational System," with the Annual Convention Program of The American Association of Park Superintendents. 40 pp. Illustrated. 1921. Published by "Parks and Recreation," Minot, N. D. (Apply to publishers.)

THE MERCHANTS' ASSOCIATION OF NEW YORK

Year Book of The Merchants' Association of New York. 337 pp. Illustrated. With alphabetical and classified list of members. (Apply to S. C. Mead, Secretary, Woolworth Building, 233 Broadway, New York, N. Y.)

LETCHWORTH VILLAGE

"Twelfth Annual Report of the Board of Managers of Letchworth Village." The Village is under the auspices of the New York State Board of Charities, Division of Mental Defect and Delinquency. Published as Legislative Document (1921) No. 68. 64 pp. Illustrated. (Apply to Frank A. Vanderlip, President of the Board of Managers, 7 Wall St., New York City, N. Y.)

PUBLIC UTILITIES

"Report of the Committee on Public Utilities" of the Chamber of Commerce of Newark, N. J. 8 pp. 1921. (Apply to Edmund W. Wollmuth, Secretary, Chamber of Commerce, Newark, N. J.)

CITY PLANNING

"The City Plan and Living and Working Conditions," by John Ihlder, Manager, Civic Development Department, Chamber of Commerce of the United States. An address delivered before the National Conference on City Planning. 15 pp. 1921. (Apply to author, Washington, D. C.)

MUNICIPAL MOTOR EQUIPMENT

"The City of Toronto as a Car Owner," published as City Budget Story No. 2, by the Bureau of Municipal Research, Toronto, Can. Brief statement of the experiences of other cities, with suggestions for increased efficiency and reduced costs. (Apply to publishers.)

SAFETY FOR CHILDREN

"Safety Lessons," suggestions prepared for teachers in the Chicago public schools. 11 pp. 1921. (Apply to Peter A. Mortenson, Superintendent of Schools, Chicago, Ill.)

MILK SUPPLY

"Report of the Commission on Milk Supply." 26 pp. 1921. Printed and distributed by The Newport Improvement Association. (Apply to The Newport Improvement Association, Newport, R. I.)

Municipal Reports

Baltimore, Md.—Annual Report of the Comptroller for the fiscal year ending December 31, 1920. (Apply to Peter E. Tome, Comptroller, Baltimore, Md.)

Bellingham, Wash.—City Comptroller's Annual Report. 1920. (Apply to Charles A. McLennan, City Comptroller, Bellingham, Wash.)

Boston, Mass.—Seventh Annual Report of the City Planning Board, for the year ending January 31, 1921. (Apply to Elisabeth M. Herlihy, Secretary, City Planning Board, Boston, Mass.)

Chicago, Ill.—Annual Reports of the Department of Public Service, for the years 1916 to 1920, inclusive, ending December 31, 1920. (Apply to William H. Reid, Commissioner of Public Service, Chicago, Ill.)

Chicago, Ill.—Twelfth, Thirteenth, and Fourteenth Annual Reports of the Municipal Court, for the three years, December 2, 1917, to December 5, 1920, inclusive. (Apply to James A. Kearns, Clerk of the Municipal Court, Chicago, Ill.)

Chicago, Ill.—Annual Report of the Treasurer for the fiscal and calendar year 1920. (Apply to Henry Stuckart, City Treasurer, Chicago, Ill.)

Chicago, Ill.—Financial Summary. Report of the Comptroller for the fiscal year ended December 31, 1920. (Apply to George F. Harding, Comptroller, Chicago, Ill.)

Chicago, Ill.—Forty-fifth Annual Report of the Department of Public Works, for the year ending December 31, 1920. (Apply to Charles R. Francis, Commissioner of Public Works, Chicago, Ill.)

Chicago, Ill.—Report of the Chicago Railway Terminal Commission. (Apply to John F. Wallace, Chairman, Chicago Railway Terminal Commission, 140 North Dearborn Street, Chicago, Ill.)

Chicago, Ill.—Eleventh Annual Report of the Chicago City Plan Commission, for the year 1920. Proceedings of the Twentieth Meeting of the Comimission. (Apply to Eugene S. Taylor, Office Manager, Chicago Plan Commission, Roof F, Hotel Sherman, Chicago, Ill.)

Detroit, Mich.—Seventy-eighth Annual Report of the Superintendent of Schools, for the school year ending June 30, 1921. (Apply to Frank Cody, Superintendent of Schools, Detroit, Mich.)

Evansville, Ind.—Annual Report of the Comptroller and Water-Works Department for the fiscal year ending December 31, 1920. (Apply to William H. Elmendorf, Comptroller, E ansville, Ind.)

Fall River, Mass.—Annual Report of the Board of Health for the year ending December 31, 1920. (Apply to Frank L. Larkin, Secretary, Board of Health Fall River, Mass.)

Fort Wayne, Ind.—Sixteenth Annual Report, Board of Park Commissioners, for the year 1920. (Apply to David N. Foster, President, Board of Park Commissioners, Fort Wayne, Ind.)

Hartford, Conn.—Sixty-first Annual Report of the Board of Park Commissioners and the Thirteenth Annual Report of the Public Cemeteries, for the year ending March 31, 1921. (Apply to E. Spencer Goodwin, President, Board of Park Commissioners, Hartford, Conn.)

Newark, N. J.—Annual Report of the Department of Health, for the year ending December 31, 1920. (Apply to Charles V. Craster, M.D., Health Officer, Newark, N. J.)

New York, N. Y.—Report of the Chief Engineer of the Board of Estimate and Apportionment for the year 1919. (Apply to the Chief Engineer, Board of Estimate and Apportionment, Municipal Building, New York, N. Y.)

Philadelphia, Pa.—Annual Report of the Department of Wharves, Docks and Ferries for the year ending December 31, 1920. (Apply to George F. Sproule, Director, Department of Wharves, Docks and Ferries, Bourse Building, Philadelphia, Pa.)

Philadelphia, Pa.—Annual Report of the Bureau of Highways, Department of Public Works for the year ending December 31, 1920. (Apply to Fred C. Dunlap, Chief, Bureau of Highways, Department of Public Works, Philadelphia, Pa.)

Pocatello, Ida.—Annual Financial Report of Bannock County, Idaho. 1920. (Apply to Robert C. Earley, County Auditor, Box 1288, Pocatello, Idaho.)

Waltham, Mass.—Annual Reports for 1920, with the fourth annual address of Hon. George R. Beal, Mayor. (Apply to Richard Steele, City Clerk, Waltham, Mass.)

Cheaper power with tractors

Tractors are proving profitable equipment for road-builders in all parts of the country—profitable because of the time saved on a given piece of work, and because of the fewer hands required.

With a BEST TRACKLAYER TRACTOR the contractor can go ahead with his work in most any weather. He moves more earth and makes a better, smoother job. His power is steady, dependable, flexible and compact. He can negotiate grades without difficulty, and in faster time.

BEST TRACTORS have proven their mettle over a period of many years in all parts of the world. They have earned a reputation for dependability, power and low cost of operation. BEST design and workmanship have been established by time and the test of actual, practical usage on a large variety of heavy-duty work.

Write for full data, prices and the names of our nearest dealers. Let us give you the details of how Best Tractors are serving road-builders.

Tracklayer "Sixty"

Tracklayer "Thirty"

"Cruiser" (60)

BEST
TRADE MARK
TRACKLAYER
REGISTERED
TRACTORS

C. L. BEST TRACTOR CO.
SAN LEANDRO, CALIFORNIA

There are three models of Best Tracklayer Tractors as shown above. All are factory built—not assembled

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Snow-Plow in Winter—Grader in Summer

The one-man "Road-Razer" manufactured by the Avery Company, Peoria, Ill., which has operated successfully in many cities and towns in helping solve the maintenance problem of dirt, gravel and crushed stone roads, has been put to use as a snow-plow with considerable success. This machine is made specifically to grade rough, rutty roads, and with a scarified attachment has torn up gravel, crushed rock and oil roads and smoothed them down to proper shape. It has also in some instances replaced the grade leveler, preparatory to laying hard roads, and has been used to spread gravel and crushed stone.

In Salina, Kans., the Street Commissioner has successfully used it for cleaning the snow off the city streets. One man operating the machine cleaned off several miles of streets in a single day after a heavy snow at very little expense.

In Great Bend, Kans., one of these machines cleaned off a half-mile of wide street on two sides of a public square, removing ten inches of snow, some of it packed and frozen into ice. The machine was run along the curb first, cleaning out the gutter, leaving ridges of snow piled out in the street about 6 feet from the gutter. Where the street is wide and the snow deep, it is well to start along the sides and throw the first round out in the street up against what has been thrown from the gutter. In this way no more snow is accumulated than the blade can readily handle. By lengthening the rear blade about a foot the work is speeded up.

These city officials have been enthusiastic over the work of the machine both as a road grader in keeping their dirt and gravel roads in trim and in its work in handling snow.

Series Multiple Street Lighting

Great advances have been made during recent years in the field of street illumination, due in large part to the high state of development of the tungsten lamp. There have been many systems of street lighting developed, but the one using series regulators or regulating transformers seems to have perhaps the largest number of advocates. The series regulators or regulating transformers are an improvement over the older types of street lighting using arc light generators, but in both cases a large initial expense is involved and the cost of operation and maintenance is rather high, while the power factor and efficiency are low. The introduction and development of a low-voltage series tungsten lamp makes it possible to use other systems of regulation that give a very high power factor and efficiency, are somewhat cheaper to install and maintain, and within reasonable limits give better regulation and are more flexible.

The average flaming arc lamp gives about 500 candle-power. When placed at street intersections, they are about 300 feet apart. This same candle-power divided into 5 units of 100 candle-power each allows the lamps to be placed every 60 feet, which means a somewhat more uniformly distributed illumination and a more pleasing effect. This result is made practical

CLEARING SNOW FROM THE STREETS OF SALINA, KAN.

The Mack Light Bituminous
Material Distributor

Your road maintenance next Spring

Now is the time to get ready

INCLUDED in our unusual line of special motorized equipment for municipalities, counties and contractors is this Mack Light Bituminous Material Distributor.

This equipment is a fool-proof machine for handling cold material and requires only a driver for its operation. The elimination of the extra operator which is usually needed on ordinary machines, means economy for its owner.

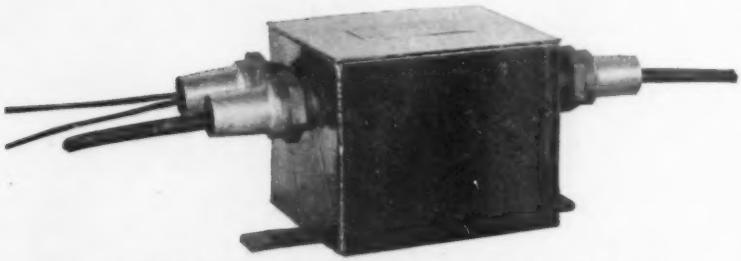
The tank body can be demounted when its particular work is done and a dump body substituted. This continuous chassis use effects large savings and many highway boards and commissioners are finding this a practical way to economize on their road maintenance equipment.

Mack TRUCKS

Capacities:
1½ to 7½ tons.
Tractors to 15 tons.

INTERNATIONAL MOTOR COMPANY
25 Broadway, New York

PERFORMANCE COUNTS



A COMPACT TYPE OF STREET LIGHTING TRANSFORMER

only by the use of low-voltage series tungsten lighting systems. Two general systems have been developed by the Kuhlman Electric Company, Bay City, Mich., one styled the type S.M. system, and the other the type B.L. system. Each has its several modifications which cover a wide field of adaptability and which enable them to fit almost any lighting conditions that may arise. A series arc regulator is unnecessary in the type S.M. system, but it may be used in the type B.L. system. Both systems are designed for overhead or underground operation.

The type S.M. or series multiple system may be furnished in two forms, one using a small current transformer at each lamp, and the other using a reactance coil at each lamp. In each system the primary circuit may be any power circuit or a separate circuit taken from the power-house or substation for street lighting purposes only. The best potential for this primary circuit is 2,300 volts, and the circuit needs only such protection as would be given any 2,300-volt power line. As many individual lighting circuits can be taken from this power circuit as the kilovolt-ampere capacity of the circuit will allow.

A constant potential transformer which has neither moving coils nor extra reactance is connected across the line, and a series circuit is taken off the secondary of this transformer. The kilovolt-amperage of these transformers is governed by the ampere capacity of the secondary and the maximum number of lamps on the circuit. The transformers are designed for 3.5-, 4-, 5.5- 6.6- or 7.5-ampere secondary, depending on which is desired; the 6.6-ampere system is most used. The secondary also has a series of standard taps for reducing the secondary voltage to conform to the number of lamps in operation. These taps are brought out of the case so as to be readily accessible when making a change.

The system using a reactance coil at the lamp is the least expensive, but has a disadvantage in having the high-voltage line wires at the lamp, making it dangerous to replace the lamp while the current is on. With a current transformer in the base of the lamp-post or on a pole, the secondary wires can be carried to the lamp, and it is perfectly safe to make a lamp change without shutting off the current, as there is a heavy insulating barrier between the primary and the secondary windings. When a lamp goes out, the open-circuit voltage of the transformer will rise only from 2½ to 3 times the normal lamp voltage, which is a negligible quantity. Each lamp is wholly independent of the rest and, no matter what happens to any individual lamp, it cannot affect the remainder of the circuit.

Dump Bodies for Garbage Trucks

The Heil Company, Milwaukee, Wis., has placed on the market a special body designed for the handling of garbage in municipalities. Two types of garbage bodies are made. The standard dump body type illustrated is equipped with six hinged doors, two of which open to the back, the other four to the side. It has a special water-tight tail gate fitted with wing nuts. A ⅜-inch rubber gasket is used for packing. All seams are electrically welded after being riveted to make them water-tight, preventing liquid garbage from dripping on the street.

This same body is furnished without covers, in which case rings are provided along the side so that a canvas tarpaulin can be tied on, to comply with city ordinances. This type of standard garbage body can be used for hauling gravel and sand wherever desired.

The other type of body has the bottom or floor tapered upward in the rear. This floor can extend to the end of the body or only part way. In the latter case a tail gate is used.

A STANDARD GARBAGE BODY FITTED WITH COVERS

TIFFIN

STREET FLUSHERS

Licensed under Ottofy Patent No. 795059

We Welcome Any Test Based on Work and Cost

We believe we can prove by service records or by any test you might arrange, that Tiffin Street Flushers will clean more pavement in a day at less cost than any other machine. Also, the work accomplished will be better done.

If we can prove that, we've done all any city street department can want.

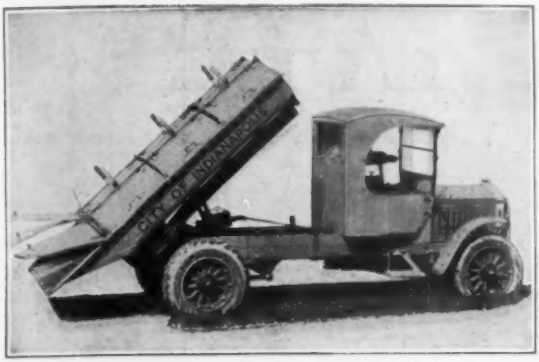
The two-motor-system design, and the operating technique, are the causes, but the result obtained is the matter of chief interest to you.

Let us submit evidence—
Do you want a demonstration?

The TIFFIN WAGON Company

TIFFIN, OHIO

Makers, also, of Tiffin Municipal Trucks, Dump and Farm Wagons, etc., etc.
Representatives in Principal Cities



THE REAR COVERS OPEN AUTOMATICALLY

The sides of garbage bodies should be made as low as possible to facilitate loading. The hydro hoist employed in all Heil dump trucks is therefore specially desirable, as all of the loading space back of the cab can be used for actual load.

The garbage dump body and the No. 4 hydro hoist is mounted on a 1½-ton chassis. The sides of the body are low; the covers are raised at the center to allow maximum load. Brake lining is used along the edges of the covers to make them fit tightly.

Crowley, La., Buys Diesel Engines for Municipal Power-Plant

The city of Crowley, La., has just purchased two Diesel engines developing, respectively, 285 brake horse-power and 380 brake horse-power, from the Fulton Iron Works, St. Louis, Mo. With this equipment the municipal power-plant at Crowley will compare quite favorably in economy with the larger central stations of the South.

George A. Johnson Company Moves Office

Because of the steady increase in amount and scope of the work of the George A. Johnson Company, Consulting Engineers, 150 Nassau Street, New York City, for some months past, they have recently moved to larger quarters. They are located in the same building, in Suite 1121-1129. The new layout is designed to meet efficiently the executive demands of their increasing business.

Chamber of Commerce Counts Ballots by Machine

Ballot-counting by machine has been introduced by the Bristol, Conn., Chamber of Commerce. Automatic counters made by the Root Company, one of the prominent manufacturing establishments of that city, were used to count the vote in the primary and the final elections just completed. The use of these machines greatly expedited the work of the tellers. Use of the counters was arranged by J. T. Chidsey, president of the Root Company, who was reelected president of the Chamber of Commerce. The Bristol Chamber has a splendid record of worth-while accomplishments to its credit. It recently undertook a successful expansion campaign under the direction of the American City Bureau, 154 Nassau Street, New York City.

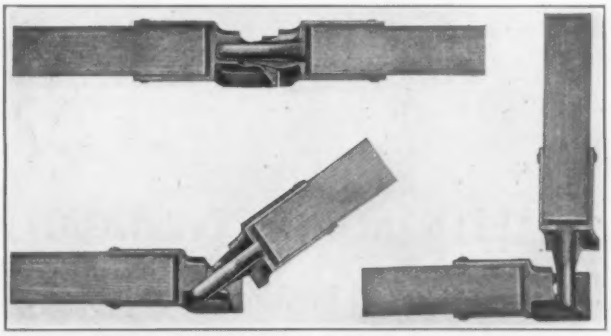
New Cletrac Advertising Manager

The announcement has been made by the Cleveland Tractor Company, Cleveland, Ohio, that Earl B. Stone has been appointed Advertising Manager, effective December 15. After 2½ years with this company, serving as Sales Representative, Assistant Advertising Manager and District Sales Manager, Mr. Stone is well qualified to assume his new duties. His former advertising experience included work with the General Fireproofing Company of Youngstown, Ohio, and the National Acme Company of Cleveland, Ohio.

Non-buckling Sewer Rods

In the course of maintenance of sewers, there are many minor obstructions that can be readily removed by means of wooden sewer rods. The Turbine Sewer Machine Company, 195 11th Street, Milwaukee, Wis., manufactures a non-buckling wood sewer rod that is water-proof and will float in 2½ inches of water. It is used chiefly in pulling cable or rope through a sewer or in clearing away minor obstructions. The couplings are such that they can be joined or uncoupled instantly.

This company also manufactures the well-known Turbine sewer cleaning machine, which will remove roots, stones and any other obstructions in any size of circular sewer.



SEWER RODS, SHOWING LOCKING DEVICE

WILLITE

TEMPERED ASPHALT PAVEMENT—THE MASTER HIGHWAY

Photo After Carrying Over 4,000,000 Tons Traffic on Los Angeles County Boulevard, equal to 15 years normal use. One of the heaviest trafficked lines in the world.

WILLITE TEMPERED ASPHALT
"TAKES THE FAULT OUT OF ASPHALT"

Before you call for bids, investigate, then specify WILLITE, the Strongest Road in the World. It has proven to be the best in 15 states under the severest service tests ever made. Traffic cannot malform the beautiful, smooth, resilient, water and frost-proof roadway of WILLITE.

In the Imperial Valley Desert of California where the temperature ranges from freezing to 130 degrees F., the experimental WILLITE roads, 5 inches thick, proved so successful, after all other types of asphaltic roads had failed, that 10 miles of WILLITE paving have since been built.

To learn some interesting facts regarding WILLITE read pages 24 and 26 in the April 16, 1921, issue of the *Saturday Evening Post*. Read lines 11 to 27, inclusive, on page 26, very carefully.

See Our Exhibit at the Good Roads Show Chicago, Jan. 16-20, 1922

Let us send you our literature and proof of the superiority of WILLITE.

WILLITE ROAD CONSTRUCTION COMPANY
OF AMERICA

711 Union Trust Building **Detroit, Michigan**

Street and Parkway Lighting Standards

The municipal official when seeking a lighting standard for use on a city street, parkway or boulevard, has in mind a standard which will be permanent, durable and attractive both during the daytime and when illuminated at night.

The lighting standards made by Caldwell & Drake Iron Works, Inc., Columbus, Ind., are made of high-quality iron of the same type as is used in automobile cylinder and ammonia compressor castings.

Since the posts are of heavy cast metal, they resist rust and corrosion admirably. The special patented connection used in fastening the post to the foundation insures that they may be struck by vehicles without breakage other than possibly the glassware and special angle clamps. After accidents the posts can be set up in a few minutes ready for service. When the posts are erected in accordance with the plans of the manufacturer, they cannot be thrown onto the street or sidewalk, at the risk of killing or injuring pedestrians or those riding by. Thus possible damage suits are avoided—a matter worthy of consideration. It is claimed that these posts are not defaced nor deformed by impact with vehicles. When other types of posts are broken by impact, they must be either scrapped or repaired by welding, which leaves marks permanently defacing the posts. It is very difficult to repair those which are dented or bent by impact.

All standard equipment, such as globes, sockets, potheads, etc., can be used with these posts, and they will also fit on most of the present foundations without the need of changing the foundation bolts. In erecting the bolts, the special angle clamps make them very easy to assemble, in that the post is set up on the foundation, the angle clamps slipped over the foundation bolts, and the nuts placed on and screwed down.

LIGHTING STANDARD IN COMMERCIAL PARK, COLUMBUS, IND.

Cutting Pipe in the Trench

A new pipe-cutting device which has the particular advantage of being able to cut pipe in the ditch with considerable speed has been placed on the market by the Ellis & Ford Manufacturing Company, Detroit, Mich.

In this machine every point in contact with the pipe is a cutting disc. Therefore, when the cutter is adjusted on the pipe it is only necessary to move it through a small arc in order to cut entirely around the pipe. In placing the cutter in position in the trench, as shown in the illustration, one of the thumb bolts is slipped out and the links run under the pipe and locked back together. The handle can be placed in any position on the rod, so as to cut in a very narrow trench. In cutting the pipe in the trench, only room enough is required to pass the length carrying the cutter wheels underneath the pipe, a feature which water-works men will appreciate particularly when they know the troubles of operating in a hard-rock trench. In making ordinary repairs or inserting specials in a line of pipe, the work can be completed with the aid of the cutter in the same space of time it would take to dig a hole so as to make a cut with hammer and chisel. In addition, the cuts are made clean and smooth, eliminating the danger of breaking the pipe or disturbing the joints.

On cast iron pipe the wheels do not cut through the pipe, but when a groove has been cut around the pipe to a reasonable depth, a little extra pressure on the screw and handle will cause the pipe to crack off. On a 12-inch water-main, this cut will not exceed ⅛-inch in depth.

Burnap Preparing City Plan for Granville, N. Y.

Granville, N. Y., has engaged George Burnap, town and city planner, Washington, D. C., to prepare a comprehensive city plan, including the laying out of a park system.

Curious facts about streets
as recorded in an engineer's note book

STREET	FROM	TO	LAID	MATERIAL	ASPHALT YARDAGE	BRICK GUTTERS	TOTAL YARDAGE	AGE	ORIGINAL COST Per SQ. YD.	TOTAL COST FOR REPAIRS Including 1921	REPAIRS Commenced	Maintenance Per Sq. Yd. Per Yr.	Total cost per Sq. Yd. Per Yr. including orig. Cost and Repairs
W.-NW	4th	5th	1917	Oil Asphalt "A"	376.68	85.81	462.49	4	1.44	$324.30	1920	$.175	$.535
W.-NW	11th	12th	1915	Oil Asphalt "B"	796.25	77.29	873.54	6	1.49	19.20	1920	.00366	.252
W.-NW	12th	13th	1896	Trinidad	1181.38	176.92	1358.30	25	1.63	572.42	1910	.01686	.0821
W.-NW	13th	15th	1899	Bermudez	3707.21	660.35	4367.56	22	1.80	294.79	1911	.00307	.0849
W.-NW	15th	16th	1913	Bermudez	1931.53	126.92	2058.45	8	1.69	000.00	0000	.00000	.211

NOTE—MAINTENANCE FIGURES ARE FOR TOTAL YARDAGE. ORIGINAL COST IS FOR ASPHALT ONLY.

GENASCO LINE

Trinidad Lake Asphalt (For streets and roofs)
Standard Trinidad Built-Up Roofing
Bermudez Road Asphalt (For road building)
Genasco Roll Roofing
Genasco Sealbac Shingles
Genasco Latite Shingles
Genasco Vulcanite Mastic Flooring
Genasco Acid-Proof Paint
Genasco Industrial Paint
Genasco Boiler Paint
Genasco Asphalt Putty
Genasco Asphalt Pipe Coating
Genasco Asphalt Fibre Coating
Genasco Tile Cement
Genasco Water-proofing Asphalts
Genasco Waterproofing Felts and Fabrics
Genasco Battery Seal Compound
Genasco Mineral Rubber
Genasco Mineral Spirits
Genasco Base Oils
Genasco Flotation Oils
Genasco Motor Oils
Genasco Soluble Oils
Genasco Saturated Asphalt Felt
Genasco Deadening Felt
Genasco Insulated Paper
Genasco Red Sheathing Paper
Genasco Stringed Felt
Genasco Wall Lining
Iroquois Road-building Machinery

Washington's Deadly Parallel

Astonishing! But the figures are official records on file in the office of the Public Works Department.

Trinidad and Bermudez are *native-lake asphalts*. "A" and "B" are manufactured oil asphalts.

Note the difference in age between the native-asphalt and the oil-asphalt sections. Then note their striking difference in cost, including maintenance and repairs.

The 25-year old Trinidad section has cost less than 2 cents per square yard per year to maintain. The four-year-old oil asphalt "A" already is costing nearly 18 cents.

Personally examined present condition of pavements. Oil asphalt "A" section is very bad after 4 years' service. Oil asphalt "B" section is still in fair shape. Trinidad and Bermudez sections are in splendid condition.

Washington's finest streets are paved with Trinidad and Bermudez. Their all-round superiority is clearly demonstrated. Would strongly advise their use on all streets where asphalt is desired.

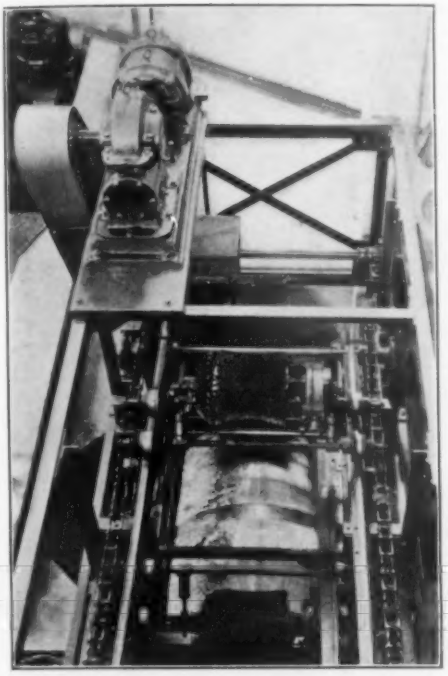
IROQUOIS SALES DEPARTMENT

New York
Chicago
Pittsburgh

THE BARBER ASPHALT PAVING COMPANY
PHILADELPHIA

St. Louis
Kansas City
Atlanta
San Francisco

TRINIDAD LAKE ASPHALT



A VIEW OF SEWAGE SCREEN IN OPERATION

A New Type of Sewage Screen

To meet the increasing demand for fine-mesh sewage screens for municipal sewage disposal plants, the engineers of the Link-Belt Company, Philadelphia, Chicago, Indianapolis, have designed a new fine-mesh sewage screen which they claim combines great strength and rigidity with efficiency and reliability of operation. The screen surface proper is a cylinder, made either of perforated plates or the Link-Belt straight wire screen. The straight wire screen consists of bronze wires stretched tight on a bronze frame. The clear opening between the wires is 1/32-inch or less.

The sewage enters from the outside of the cylinder and is discharged at one end from the inside. Between 90 and 95 per cent of the total screening area is submerged, or, in other words, is effective. Seal rings separate the clarified from the raw sewage. The sewage screen is cleaned by revolving brushes which always travel in line with the openings, but never across them. This feature and the small openings made possible by the straight wire screen insure the removal of all but the finest solids in suspension. No parts of the driving machinery are hidden, and all parts of the screen can be inspected and cleaned without interrupting the operation.

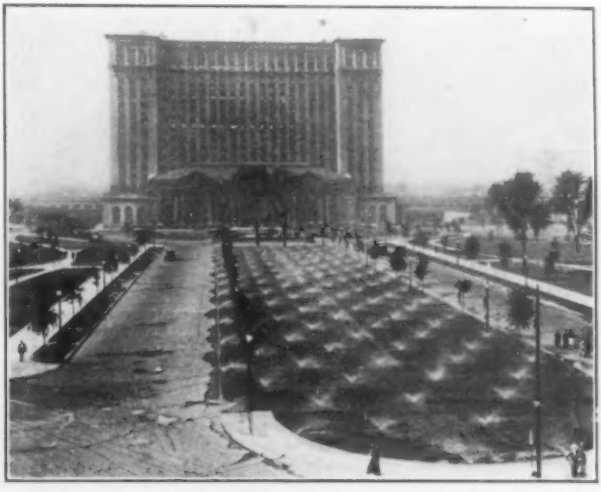
Two of these screens are now in operation at the sewage treatment plant of the city of Pleasantville, N. J., and are doing good work. From 70,000 gallons per day, one screen removes 4 cubic feet of sludge at a rate of 57 cubic feet per 1,000,000 gallons.

Convenient and Effective Lawn-sprinkling System

A frost-proof underground sprinkling system for parks, lawns and public grounds has been placed upon the market by John A. Brooks, 443 Penobscot Building, Detroit, Mich. It consists of a series of specially made sprinklers set level with the ground, to be out of the way of lawn mowers, and having underground pipe connections so arranged that the entire lawn may be watered by turning a single valve. After the sprinklers have operated any set length of time, the system is automatically shut off by a self-closing valve.

When not in use, the sprinkler is level with the ground and, all openings being completely covered, it can receive no injury from any use of the lawn. In operation an inner nozzle rises up above the grass, so as to give an unobstructed delivery of water. The sprinkler is made entirely of brass, has no moving parts to wear out, and is constructed to be proof from the surrounding dirt as well as from that in the water.

Installing this system does not mean that the lawn has to be marred by deep digging. The piping is placed only a few inches below the

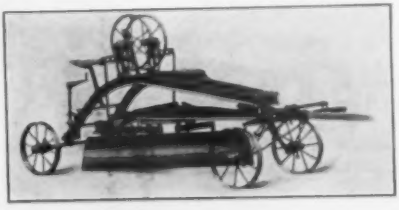


ROOSEVELT PARK, DETROIT, MICH., WITH ITS LAWN SPRINKLERS IN ACTION

THE BIG THREE

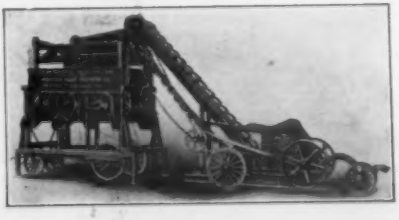
MEN MATERIALS & MACHINERY

were responsible for this road and every other good road ever built. Not the least of these three is Machinery. No road or street can be economically built or maintained without the use of modern machinery.



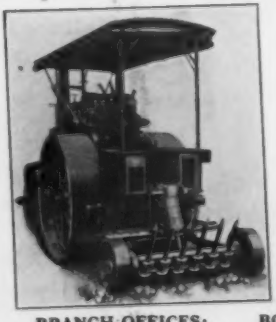
ROAD GRADERS.

A road grader is absolutely necessary in the construction and repair of dirt roads. We make six sizes of Winner Graders, as follows: The Baby Winner with a 5 foot blade; the Winner Patrol with a 6 foot blade: the Little Winner with a 6 foot blade; the Standard Winner with a 7 foot 6 inch blade; the Big Winner with an 8 foot blade, and the Giant Winner with a 10 foot blade.



ROCK CRUSHERS.

Wherever stone is available a rock crusher should be used. We furnish complete rock crushing outfits, portable or stationary, with capacities ranging from 50 to 1000 tons daily. Complete outfits consisting of crusher, elevator, screen, bin, power, etc., designed, built and installed.



ROAD ROLLERS.

The Monarch Steam Road Roller is a high class, standard roller made in 10 and 12 ton sizes. Rollers have ample engine and boiler power. They are flexible, dependable and extremely serviceable. Furnished with or without steam scarifiers.

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"EVERYTHING FOR THE ROADMAKER"

The GOOD ROADS MACHINERY Co INC.
KENNET SQUARE PENNSYLVANIA

BRANCH OFFICES: BOSTON, MASS. NEW YORK, N. Y. PHILADELPHIA, PA.
PITTSBURGH, PA. CHICAGO, ILL. ATLANTA, GA. KANSAS CITY, MO.
PORTLAND. OREGON. SAN FRANCISCO AND LOS ANGELES, CAL.

surface. A narrow strip of sod is taken up, and after the piping is down, the sod is carefully replaced so that it is scarcely possible to detect a blemish in the lawn. Although no part of the sprinkling system is placed below the frost line, the entire installation is made frost-proof by the use of an automatic draining sprayer. All piping slopes to the point where this sprayer is used, and as the water is shut off, the attached draining valve automatically opens, emptying the system. All use of hose and the labor required in sprinkling with the old method are eliminated by this system. In addition, the lawn is watered evenly and in a minimum time.

A New Garbage and Refuse Dump-Wagon

A new dump-wagon especially adapted for cities and towns where garbage and refuse are to be hauled to an incinerator and dumped onto barges at the water-front or at other plants, has been designed and is now for sale by George H. Holzbog & Brothers, Jeffersonville, Ind. For twenty years this company has been building round-bottom steel sanitary carts for the hauling of sewage, wet garbage, slops, night-soil, or anything of a liquid or semi-liquid nature. These vehicles are built with two or four wheels for two- or four-horse hauling. Following up their success in this line and at the request of numerous city officials, the manufacturers have devised this wagon, especially for the hauling of dry, light, bulky refuse, having an extra large capacity, a low-hanging bed, light weight and end dump.

The wagon illustrated herewith is built in 2-horse and 1-horse sizes, holding 5 and 3 cubic yards respectively. The body has hinged wings which are dropped down when heavy material is being hauled, or raised when light, bulky matter is carried. The dumping arrangement is such that one man can dump a whole load without great effort. The height from the ground to the top of the bed on the smaller wagon is 48 inches, and on the two-horse wagon 58 inches, not including the extra drop wings. Each wagon has a sliding step or platform on which the loader may rest the barrel or box he is lifting into the wagon.

It has already been demonstrated that the larger wagon will haul the same amount with one crew of men and one team of horses as three of the ordinary dump-wagons with three teams and three sets of men. The actual saving, therefore, is sufficient to pay for a wagon in about sixty days. The wagons are built of high-grade material throughout, the wheels are of the Archibald iron hub pattern, claimed to be the strongest and most serviceable wheel made. The frame of the gear is of steel angles, giving long life to the wagon.

One of the schemes for the use of these wagons consists in making the house-to-house collection with the wagon drawn by horses, leaving it at a specified point where the horse pole can be readily shifted to a short trailer pole and then, by a truck or a tractor, hauling a string of the wagons to the point of disposal some distance away.

S. M. Williams Now with Autocar

S. M. Williams, Chairman of the Federal Highway Council, which has discontinued its highway activities, has become a special representative of the Autocar Company, Ardmore, Pa. Mr. Williams began his highway work with the organization of the Highway Industries Board during the war. Following the disbanding of the Board, he formed the Federal Highway Council, which in the last few years has been active in developing store-door delivery, studying sub-soils of highways, and supporting useful highway legislation.

ONE MAN CAN READILY DUMP THIS BODY

Fiscal Agents for Bond Payments

The United States Mortgage and Trust Company, 55 Cedar Street, New York City, has been appointed fiscal agent for the payment of principal and interest of bond issues aggregating $2,273,500, including Durham, N. C., $525,000; Memphis, Tenn., $425,000; Iredell County, N. C., $400,000; and Winston-Salem, N. C., $325,000. These and others aggregating $13,281,600 are being prepared and certified as to genuineness by this company. They include: Jersey City, N. J., $4,167,000; Harrisburg, Pa., $800,000; Lenoir County, N. C., $700,000; Wilmington, Del., $697,000; and Milburn, N. J., $298,000.

ask any user

Saves 6 to 10 Men

UNLOADING cars, loading trucks, storing or reclaiming coal, ashes, sand or similar material.

This light-weight portable conveyor is a complete answer to conveying problems at thousands of plants and its first and operating cost is but a fraction of the cost of a more elaborate, but no more capable, conveying system.

Our catalog No. 46 shows how a a great number of conveying problems have been met by this machine. May we send you a copy?

Portable Machinery Co.
Passaic, N. J.

The SCOOP CONVEYOR

A Sectional Grand Stand for Municipal Use

Celebrating the return of our soldiers in the early part of 1919, parades were held in every city of the country. These parades called for an enormous number of temporary grand stands, erected at great public expense only to be torn down later, with an almost total loss. They were often unsightly structures, and usually caused annoyance by blocking traffic for many days before and after their use.

Realizing that this was merely an aggravation of a permanent condition in all large cities, the Wayne Iron Works, Philadelphia, Pa., manufacturers of iron fence and other steel work, designed and patented a grand stand to overcome these defects, and the first complete stand was finished in the fall of 1919.

THE "MAKINGS" OF A GRAND STAND

In principle this grand stand is like a sectional bookcase. The standard interchangeable sections are 42 inches long, 32 inches deep and 17 inches high. They each consist of four vertical members, connected by a triangular bracing, all of steel angles, hot-riveted at all connections. The gusset plates at the four corners are heavy steel hinges, which allow the sections to fold flat for storage. They cannot fold when in use, for each group of sections is supported by flanges which are diagonally braced from corner to corner. The sections dowell into the flanges and into each other, making lateral movement impossible.

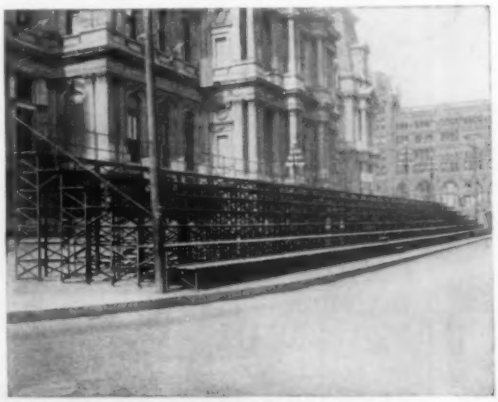
The seat boards are 30 inches wide, and supported and stiffened by steel battens, which fit over the sections. Steel guard-rails for both back and sides, which fold for storage, complete the structure.

The sectional feature enables the stand to be made as long or as high as desired. It can be added to merely by purchasing additional sections.

The stand is adaptable to any situation where it may be required. For parades it may be set up in as many tiers as the sidewalk width will permit, and the length may be varied to suit conditions. For football it can be used as a long, low stand, and it can be changed for baseball to short high stands. Narrow seats can be purchased for indoor use, where it is necessary to crowd many people into a small space. The sections can also be set up as a level platform for use as band-stand or stage. They can also be used for benches and tables.

Skilled labor is not needed to set up this grand stand; no tools are required in erection or removal. Not a bolt, screw, nail or pin is used. There are no small pieces to get lost.

The Wayne sectional grand stand is durable and economical. The sections being made entirely of steel, there is nothing to wear out. It can be erected and taken down as often as desired. Its erection makes no dirt, its appearance is neat, and its removal causes no waste or lost material.



THE "MAKINGS" IN SERVICE

The stand here illustrated, with a seating capacity of 1,000 persons, was erected in one working day by a foreman and eight unskilled laborers, and was removed by the same men in three hours. The two views show exactly the same material, folded and erected, illustrating the small storage space required.

This grand stand is absolutely safe and the design and construction have been approved by the Bureau of Building Inspection of Philadelphia. In use it has been loaded to double its rated capacity without the slightest risk.

Its use by the city of Philadelphia, the Bell Telephone Company, the Bureau of Recreation of Paterson, N. J., as well as many schools, both public and private, is evidence that it fills a long-felt need.

Lighting Standards

Caldwell and Drake
Parkway
and
Boulevard
Standards
are
First in

QUALITY
DURABILITY
STABILITY
SAFETY
BEAUTY
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THE FIRST INDUSTRY.

THE FIRST INDUSTRY.

Paving Brick

Leads the Way to Better Public Service

SECRETARY HOOVER urges all industry to clear its decks for better service by eliminating waste.

One essential element in this process is the elimination of needless styles and varieties of all products.

The Paving Brick industry, with the co-operation of the users of its product, is the first industry to meet the Government's request and present a comprehensive schedule which recommends the elimination of 55 needless varieties of paving brick, by "mutual consent" of manufacturers and users.

This keynote performance has set the pace for all other industries.

The remarkable conference in Washington last November, and at which definite action was taken, was participated in by:

American Association of State Highway Officials
American Ceramic Society
American Electric Railway Engineering Association
American Engineering Council
American Engineering Standards Committee
American Institute of Architects
American Institute of Mining and Metallurgical Engrs.
American Society of Civil Engineers
American Society for Municipal Improvements
American Society for Testing Materials
Columbus (O.) Engineers' Club
Federated American Engineering Societies
Indiana Engineering Society
National Paving Brick Mfrs. Association
U. S. Chamber of Commerce
U. S. Bureau of Mines
U. S. Bureau of Public Roads
U. S. Bureau of Standards
U. S. Department of Commerce
U. S. Army
U. S. Navy
Western Society of Engineers

The 11 standards of this conference were ratified by the National Paving Brick Manufacturers and adopted as the Standards of this Association by formal action at Pittsburgh, Pennsylvania, December 7, 1921. They are as follows:

PLAIN WIRE-CUT BRICK (VERTICAL FIBRE LUGLESS)

Width		Depth		Length
3 "	x	4 "	x	8½"
3½"	x	4 "	x	8½"

REPRESSED LUG BRICK

Width		Depth		Length
3½"	x	3½"	x	8½"
3½"	x	4 "	x	8½"

VERTICAL FIBRE LUG BRICK

Width		Depth		Length
4 "	x	3 "	x	8½"
4 "	x	3½"	x	8½"

WIRE-CUT LUG BRICK (DUNN)

Width		Depth		Length
3½"	x	3 "	x	8½"
3½"	x	3½"	x	8½"
3½"	x	4 "	x	8½"

HILLSIDE LUG BRICK (DUNN)

Width		Depth		Length
3½"	x	4 "	x	8½"

HILLSIDE LUG BRICK (REPRESSED)

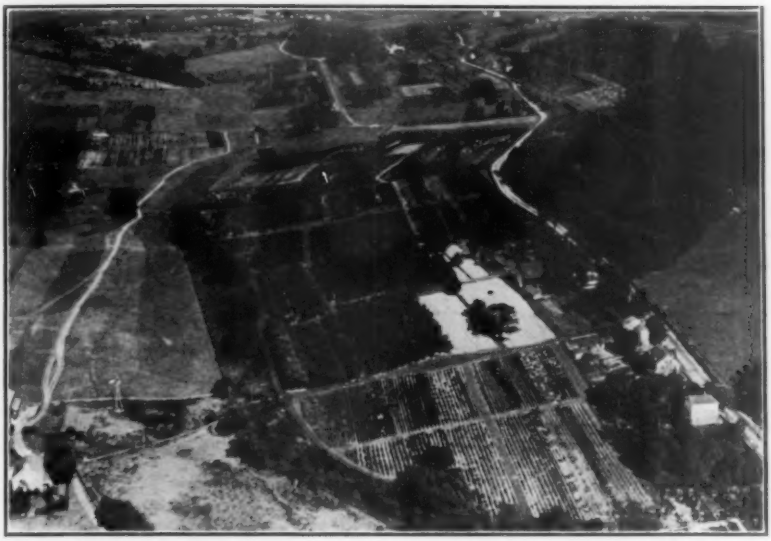
Width		Depth		Length
3½"	x	4 "	x	8½"

A COPY OF THESE PROCEEDINGS will be sent to you upon request and will bring you knowledge and understanding of rapid development up to date.

The burned-in service value of vitrified Paving Brick is matched by the aggressive Public Service spirit of the Paving Brick industry.

Natl. *PAVING BRICK* Mfrs. Assn.
800 Engineers Building Cleveland, Ohio

Eastern Paving Brick Manufacturers Association, Lincoln Building, Philadelphia, Pa.
Indiana Paving Brick Manufacturers Association, Fidelity Trust Bldg., Indianapolis, Ind.
Illinois Paving Brick Manufacturers Association, Chamber of Commerce, Chicago, Ill.
Ohio Paving Brick Manufacturers Association, Hartman Building, Columbus, Ohio
Southern Clay Manufacturing Company, Volunteer Building, Chattanooga, Tenn.



AN AIRPLANE VIEW OF A PORTION OF ANDORRA NURSERIES

A Trip to Andorra Nurseries

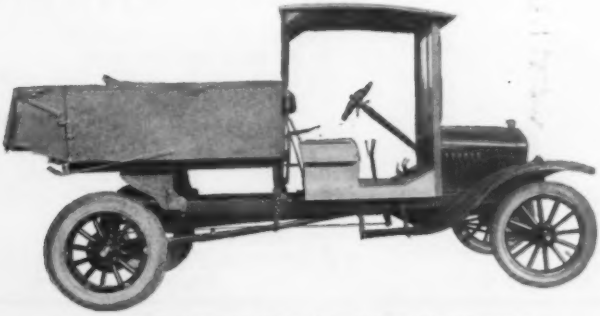
Situated at the northern entrance of the far-famed Wissahickon Drive through Fairmount Park to Philadelphia, Andorra Nurseries are located in a rolling country offering a great variety of soils and exposures. With this great advantage of soils is coupled a range of temperature from the 20-below-zero days in the winter of 1917 to the hot, dry summers of this latitude, so that it is possible to grow hardy trees, evergreens and shrubs and to reasonably insure their success in every part of this country of varied climatic conditions to which their habits of growth fit them.

It is difficult to appreciate the extent of these nurseries, even when motoring by them or through them. The accompanying illustration, however, an airplane view showing the 300-acre Spring Mill Valley section of the nurseries, looking south, gives the reader some idea of their 1,100-acre tract on the direct highway between Philadelphia and Reading.

A Light-Weight Garbage Collection Truck

The Anthony Co., Inc., Streator, Ill., has developed a garbage dump body which has been found particularly valuable by a number of cities, such as Plymouth, Pa., St. Louis, Mo., Globe, Ariz., Thomasville, Ga., and Alexandria, La.

Plymouth, Pa., has two Anthony garbage dumps which have been in use for more than two years and St. Louis has a large number mounted on Ford trucks. The Anthony leak-proof solid steel garbage dump body on Ford trucks is an automatic dumping proposition. By touching the lever in the center of the driver's seat, the dump tips to a 50-per cent angle, opening automatically at the end gate and raising the top cover. The capital investment in these bodies and the trucks is much less than in a heavier type of truck and body.



A HANDY OUTFIT FOR GARBAGE COLLECTION

Idle Cars and Men Mean Lost Profits

The Haiss Portable Belt Conveyor Keeps Them Working

Load your cars the instant they move up—The Haiss Portable Conveyor has a continuous capacity of 100 to 150 yards an hour at a cost of ½ cent per yard for power. **It is portable—goes anywhere.**

Write now for full particulars of the Haiss Portable Belt Conveyor.

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Type C—Sidewalk Joint ½" a Specialty For Concrete Roads—Granite—Brick and Wood Block Paving—Buildings—Bridges—Walls and Reservoirs

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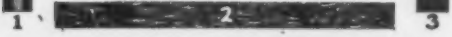

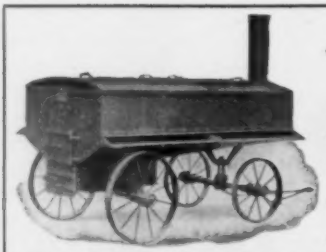

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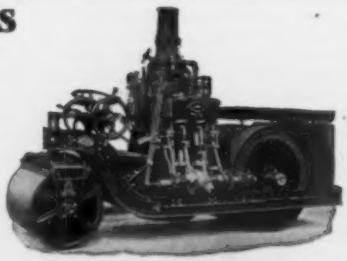
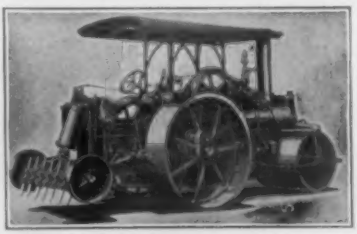


THE ERIE MACHINE SHOPS **ERIE, PA.**

QUALITY MACHINERY



With Pressure Cylinder Scarifier

BUFFALO PITTS ROLLERS

Are purchased by Discriminating buyers due to the many years of satisfactory service which they will render, the low repair costs and their general reliability.

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STEAM AND MOTOR ROLLERS

Users of Buffalo Pitts and Kelly Springfield Rollers should equip rollers with Pressure Cylinder Scarifiers.

Full information as to cost furnished on request.

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SPRINGFIELD, OHIO